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MONTANA COMMUNICATIONS STUDY

MONTANA TELECOMMUNICATIONS ADVISORY COUNCIL

STATE OF MONTANA

VOLUME II
AUGUST, 1982

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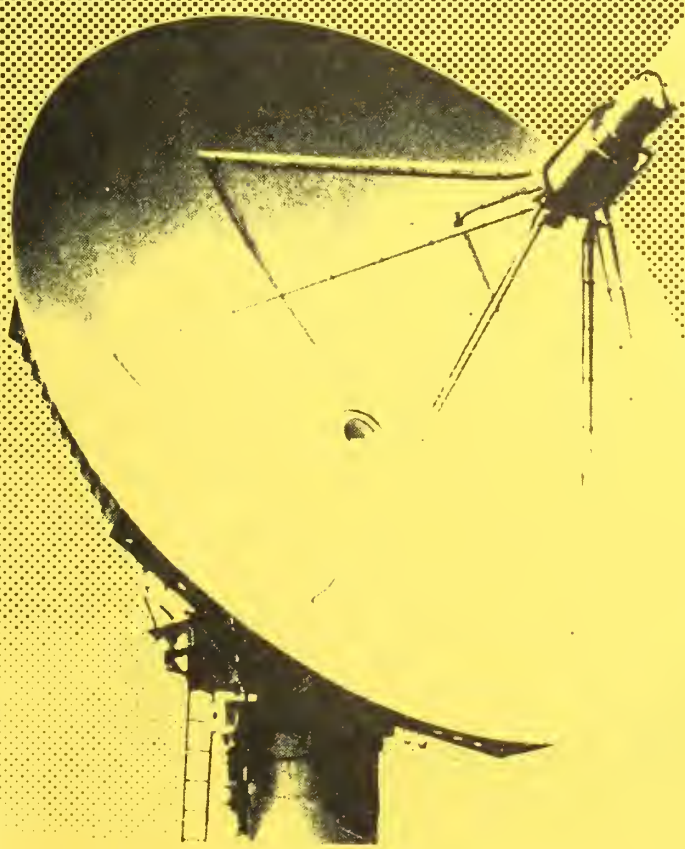

State of Montana

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MONTANA COMMUNICATIONS STUDY

MONTANA TELECOMMUNICATIONS ADVISORY COUNCIL
DEPARTMENT OF ADMINISTRATION
STATE OF MONTANA

August, 1982

VOLUME II

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INTRODUCTION

The reports contained in Volume II of the Montana Communications Study were commissioned as part of the Montana Telecommunications Advisory Council grant from the U. S. Department of Commerce's National Telecommunications and Information Administration, Public Telecommunications Facilities Program.

These reports are intended to supplement the principal findings of the Council in Volume I. The reports in this Volume are solely the opinions and judgments of the consultants employed to produce them and are not necessarily the opinions or conclusions of the Montana Telecommunications Advisory Council or the State of Montana.

STATE OF MONTANA TELEPHONE SYSTEM: USER PERCEPTIONS

PREPARED BY:
BEVERLY R. MAGLEY

JUNE 12, 1981

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EXECUTIVE SUMMARY

An overview of the existing Montana State Telephone System is presented. Information and data are obtained using two methods: personal interviews and mail survey questionnaires. Nineteen department supervisors were interviewed and responded to questions about their telephone systems. Two hundred twelve employees from around the state returned the questionnaire by mail.

Results obtained show that primary problems encountered are "system busy," and "escalating costs." A substantial number of all respondents feel that the difficulty involved in the placing of WATS calls is unacceptable.

Nearly sixty percent feel that they can function efficiently for no more than three years with their existing telephone systems.

Telephony features most in demand are: call waiting indication, call hold, hunting, intercom, automatic route selection, pushbuttom dialing, and speed dialing. In addition, individual call transfer and WATS timing were selected by most interviewed respondents.

Detailed responses from individual agencies are provided, as well as responses from universities and colleges located within the State. Further, detailed responses from personal interviews of supervisory personnel located in the Helena area are provided. Composite responses are also given for these areas.

INTRODUCTION

Communication by wire, cable, radio, or other electromagnetic equipment becomes more essential every day. In 1977, Americans used their telephones to place a daily average of 467 million local calls and 38.8 million long-distance calls. Currently, telecommunications capture greater than 60 percent of all U. S. communications revenues, and that figure continues to rise.

Not surprisingly, modern telecommunications play an essential role in state government. The State of Montana, recognizing this importance, as well as the rapidly changing state-of-the-art technologies in the field of telecommunications, created the Montana Telecommunications Project in August of 1980. The Project was charged with three major tasks: 1) to conduct a general inventory of existing Montana telecommunications equipment and facilities; 2) to assess the telecommunications needs of Montana; and 3) to develop a comprehensive plan suggesting directions the state could pursue in attempting to meet those needs. The major telecommunications technologies to be addressed are land/mobile radio systems, telephone systems, data transmission, public radio, and public television. This report deals with the assessment of needs within the Montana State Telephone System.

Existing Montana State Telephone System (MSTS)

The MSTS is administered by the Communications Division of the Department of Administration. Authorization for telephone administration is set forth in Section 2-17-301, Montana Codes Annotated.

The MSTS is a network of approximately 150 interconnected tie lines and WATS (Wide-Area Telecommunications Service) circuits. The tie lines are

individual circuit groups which connect 13 Montana cities and Helena (see Figure 1). Each outlying city or circuit group has a designated three-digit code for access. The WATS circuits are flat-rate long-distance circuits originating in Helena and serving all areas of Montana not connected by tie lines, including the continental United States. The Montana WATS line code is accessed with the three-digit code "151," while the nationwide WATS service uses "171" for access. All WATS calls are logged for statistical analysis.

The MSTS presently operates a dial tandem network consisting of 146 tie lines to various Montana cities, 27 intrastate WATS, and 16 interstate WATS. The system is presently switched through the Helena number five crossbar by use of access code "8" from all authorized satellite stations, followed by the appropriate three-digit code.

State and local governments in Montana are served by the Mountain Bell network, eight cooperative systems, and nine independent telephone companies. There are over 70,000 telephone stations in Montana and 136 telephone exchanges in addition to the extensive Mountain Bell network.[1] A schematic representation of the MSTS can be examined in Figure 1.

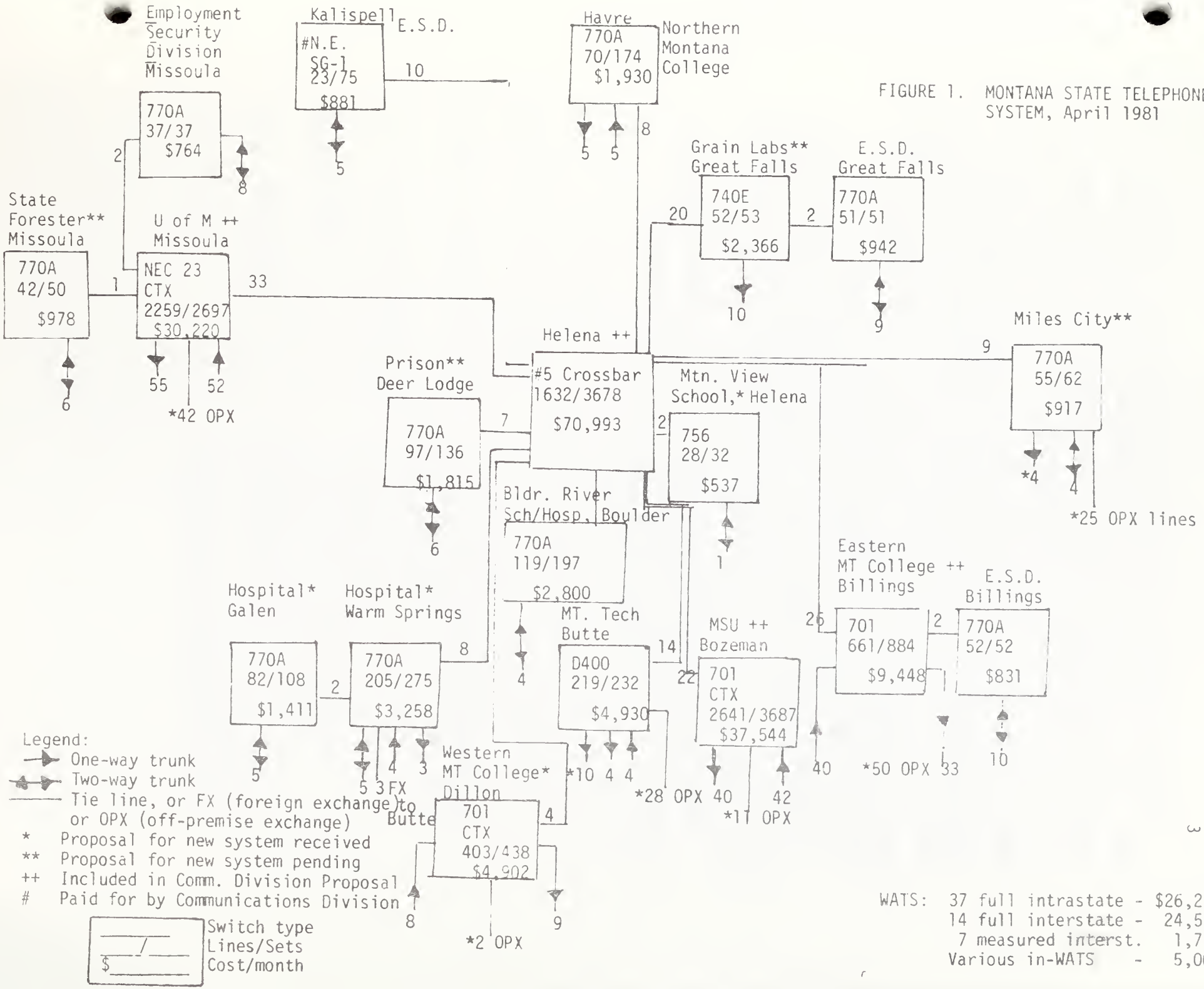
Purpose

A principal goal of the Montana Telecommunications Project is the identification of telephony needs for the MSTS users. Any accurate assessment of needs must come primarily from the agencies themselves. A lack of technical expertise, however, or autonomous operation within an otherwise integrated system, can cause isolation, an inability to reap the benefits of a wide-area information flow, or substandard interagency communication. The Montana Telecommunications Project can aid in coordinating the needs assessment for the state system.

---

[1] "Montana State Telecommunications Project 1980 Report," pp. 34-36.

FIGURE 1. MONTANA STATE TELEPHONE SYSTEM, April 1981



WATS: 37 full intrastate - $26,270
14 full interstate - 24,584
7 measured interst. 1,792
Various in-WATS - 5,000

The steps involved in coordinating an MSTS assessment of needs are three. The first step is to obtain an overview of the existing system, including an understanding of the role it now plays and its limitations, capabilities, and usefulness. The second step is to collect detailed information on a divisional or agency basis, determining specific needs and applying technical expertise to the problems. The third step is to make recommendations, taking into consideration specialized needs, cost effectiveness, and systemwide MSTS functions. All possibilities for coordination of resources and maximization of usefulness will be investigated.

This report provides an overview of the existing MSTS. Nineteen state departments participated in this phase, giving personal interviews concerning their current telephone systems and projected needs for future usage.

Additionally, 500 state employees were surveyed by mail to supplement the information obtained from interviewed departmental administrators.

METHODOLOGY

Two survey techniques were selected to achieve the project goals: the personal interview and the mail survey. An analysis of these techniques can be seen in Table 1.

A preliminary meeting was held with a Mountain Bell representative to gain an understanding of its role in the MSTS. Personal interviews were conducted with 19 department directors or their designees. The participating departments or agencies and the respondents are:

Dept. Administration	Ted Whitling, Administrator Communications Division
Dept. Agriculture	Mary Evans, Administrator Centralized Services
Office of State Auditor	Roy L. Phelps, Deputy State Auditor Administrative Division
Dept. Fish, Wildlife & Parks	Sharon Garden, Executive Secretary Director's Office
Office of Governor & Lt. Gov.	Betty Haight, Administrative Assistant David Wanzenreid, Executive Assistant Executive Office
Dept. Health & Env. Sciences	John W. Bartlett, Deputy Director Director's Office
Dept. Highways	John L. Prebil, Administrator Centralized Services Division
Dept. Institutions	John Thomas, Chief Data and Information Services Bureau
Dept. Justice	John Mathews, Assistant Administrator Central Services Division

Dept. Labor and Industry	William G. Groepper, Assistant Deputy Administrator Employment Services Bureau
Dept. State Lands	Kelly Blake, Administrative Officer Commissioner's Office
Dept. Livestock	Dianna Hultman, Administrative Secretary Animal Health Division
Dept. Military Affairs	Kenneth E. Cottrill Centralized Services Admin. Army National Guard Headquarters
Dept. Natural Resources and Conservation	Jerry Smith, Assistant Administrator Centralized Services Division
Dept. Professional and Occupational Licensing	Mary Lou Garrett, Administrative Officer Central Services
Office of the Superintendent of Public Instruction	Marilyn Miller, Administrative Assistant Office of Supt. of Public Instruction
Dept. Revenue	John Clark, Deputy Director Director's Office
Dept. Social and Rehabilitation Services	Joseph E. Winfield, Chief General Services Bureau
Montana University System	Paul Dunham, Director of Planning and Research Office of Commissioner of Higher Education

TABLE 1. SURVEY METHODS

Method	Advantages	Disadvantages
Personal Interviews*	Yields a higher number of returns from a 100 percent sample. The information is likely to be more correct. Supplementary information can be recorded to clarify the responses. The informant will become oriented to the topic under investigation. The language of the questionnaire can be clarified by the interviewer. The informant can contribute additional and relevant topics.	Costs of labor and transportation are excessive for large samples. Poorly trained interviewers can distort or bias the returns. The organization of interviewers, supervisors and planners is more complex than with other survey methods. The interview and transportation takes more time than with other methods. The block of interview time must be convenient for the informant.
Mail Surveys**	Wider distribution in less time. No interviewer bias. Centralized Control from one office with built-in controls. Better likelihood of a thoughtful reply particularly if historic data is needed for an adequate response. Lower cost of labor and transportation. Questions may be answered at the convenience of the informant.	The problem of the nonrespondent affects survey accuracy. Follow-up mailings may be required for an acceptable response. Questionnaire may be too long or too difficult to insure a high level of confidence in the data. Misinterpretations may go undetected and unrealized. No control over the quality of the informant. Questions must be very carefully standardized and self-explanatory. Checks on the honesty and reliability of the return are difficult to devise. Unsatisfactory or incomplete questionnaires are difficult to correct. Written answers may be misinterpreted.

* For additional information see: Charles S. Mayer, "Data Collection Methods: Personal Interviews," Handbook of Marketing Research, ed. Robert Ferber (New York: McGraw-Hill, 1974), pp. 2-82 to 2-89.

** For additional information see: Paul L. Erdos, Professional Mail Surveys (New York: McGraw-Hill, 1974), pp. 22-74.

In the week preceding the interview, each respondent received a memorandum which confirmed the time and date of the interview, outlined the purpose of the interview, and provided a detailed agenda for the interview. (See Appendix A for a copy of the memorandum.) This ensured adequate time for preliminary deliberation or information-gathering by the respondent.

The information collected from the interview followed the guidelines set forth by the Telecommunications Project Director. Some clarification of items or rewording of questions was done where necessary.

All interviews were conducted by one interviewer in a face-to-face situation. Meetings were conducted in the respondent's office or a nearby conference room, ensuring a minimum of interruption. A verbal description of the Telecommunications Project and its goals was given, followed by a brief explanation of this project's purpose. The format outlined in the memorandum was adhered to, and the interview concluded with a summary discussion of the department's long-term projected telephony needs.

All answers were recorded as the interview progressed. At times questions or items needed to be clarified for the respondent. Some answers were read back to the respondent to confirm the accuracy of the recorded statement.

The mail survey was conducted concurrently. The interview questionnaire was revised and shortened slightly to accommodate the different conditions which arise from collecting information by mail (see Appendix B). However, similar information was collected with both survey techniques.

Five hundred state employees were selected; the survey was mailed to them on May 21, 1981. One hundred twenty of the recipients are employed at the state universities and colleges. An effort was made to select the most representative sample possible, within the limitations imposed by available data. Table 2 shows the employee distribution of the mailed survey.

TABLE 2. DISTRIBUTION OF STATE EMPLOYEES PARTICIPATING IN MAILED SURVEY

Agency	Number of Employees	Number Selected for Mail Survey	Number of Returned Surveys
Legislature	144	4	1
Governor's Office	58	2	1
Secretary of State	29	1	1
Auditor	52	1	0
Supt. Public Instruction	146	8	5
Crime Control	20	1	0
Justice	481	16	8
Public Service Regulation	39	1	0
Public Education	10	3	3
Deaf and Blind	121	2	0
Historical Society	39	3	0
Fish and Game	448	19	7
Health	292	6	5
Highways	1955	63	35
Livestock	131	5	5
Natural Resources	393	20	6
Revenue	1000	37	17
Administration	437	22	12
Agriculture	97	3	3
Institutions	177	7	3
Boulder River School	465	14	4
Center for the Aged	127	3	0
Eastmont	93	7	0
Galen	258	10	4
Mountain View	71	4	0
Pine Hills	128	4	0
Prison	273	13	1
Swan River	28	2	0
Veterans Home	64	2	0
Warm Springs	597	11	2
Community Affairs	127	2	0
Labor and Industry	865	28	12
Military Affairs	31	1	1
SRS	1037	42	19
Mines and Geology		1	1
MSU		45	14
U of M		35	22
EMC		25	17
WMC		10	2
MT Tech		10	4
TOTAL		507	212

All responses to the mailed questionnaire received by June 9, 1981 were tabulated. Returns were analyzed to obtain the following information:

Total: Agency Responses

Total: Helena Agency Responses

Total: Out-of-town Agency Responses

Total: Responses of Personal Interviews

Individual Agency Responses:

a) Helena only

b) Out-of-town totals

c) Individual out-of-town agencies

d) Individual college and university totals

Raw figures are presented for each response category. Percentages were calculated for final tabulations of grouped data.

Any pertinent comments written by survey respondents are presented with their agency's sheets.

College and university responses are kept separate from all other totals. Each of these organizations has a unique system and the data is best presented individually.

Individual statements and observations made at the personal interviews is presented with that agency's Helena data.

RESULTS

The mailed questionnaire was returned by 212 employees. Fifty-nine are employed by state colleges and universities, 93 are employed by Helena agencies, and 60 represent out-of-town state agencies.

The tabulated survey results are presented in Tables 3-35. Table 3 represents the total of all responses excluding colleges and universities. Table 4 is the total of all Helena agency responses, and Table 5 is the total of all field office, or out-of-town agency responses. Of the agency questionnaires received, 42 percent of the respondents use the telephone 11 or more times each day. An additional 36 percent indicate that they use the telephone 3-10 times per day. This is a very high percentage (78%) of all employees returning the survey who use the telephone on a regular basis (3 or more times/day) and would be familiar with its existing functions.

"System busy" is the most frequent problem encountered (38% responded "Often" and 26% responded "Very frequently"), followed by a concern with "Escalating costs." Twenty percent of all employees note "Often" for that category and an additional 13 percent note "Very frequently." "System interference" is the third most problematic area, with 15 percent responding "Often" and 7 percent responding "Very frequent." All other problems in Question #3 have 80-95 percent of the responses in the "Infrequent" category.

Question #4 asks if an acceptable percentage of a) WATS calls, and b) in-house calls can go through. Sixty-six percent respond "Yes" for WATS calls,

and 86 percent respond "Yes" for in-house calls. One-third (33%) of the employees respond that they are dissatisfied with the percentage of WATS calls that get through without a busy signal.

In Question #5, 72 percent indicate that their organization's telephone system has grown in the past five years. Sixty-three percent feel that a new or upgraded telephone system is unnecessary (Question #6). Question #7 has three response categories. Twenty percent indicate that they could function efficiently for only one year with their existing system. Thirty-nine percent indicate "2-3 years" and 41 percent respond "4-5 years."

Question #8 lists 38 telephone system features. All of the responses were summed up, and the percentages represent $\frac{\text{individual item}}{\text{sum}}$.

Items most in demand by respondents are: (l) call waiting indication (7%), (k) call hold (6%), (p) hunting (6%), (r) intercom (6%), (i) automatic route selection (5%), (t) pushbutton dialing (5%), and (cc) speed dialing (5%). Four percent note (j) call forwarding, (q) individual call transfer, and (bb) add-on conference. Three percent indicate (b) attendant busy lamp field, (g) automatic dialers, (o) direct-in-dialing, (v) WATS timing, (w) queueing, and (ee) camp-on. No other category received more than 2 percent of the responses.

Total responses from Helena agencies are as follows. Thirty-seven percent use the telephone 3-10 times each day, and 49 percent use it 11 or more times. Together, that is 86 percent. Sixty percent say they call long distance 3 or more times each day. Problems encountered"Very Frequently"are "System busy" (26%) and "Escalating costs" (22%). Problems encountered "Often" are "System busy" (43%), "Escalating costs" (23%), and "System interference" (16%). Other problems received 89-92 percent "Infrequent" responses.

Question #4a received 67 percent "Yes," while #4b received 89 percent "Yes." Seventy-eight percent respond "Yes" for system growth, and 59 percent think that a new or upgraded telephone system is necessary.

Responses to Question #7 are: 26 percent - "1 year," 42 percent - "2-3 years," and 32 percent "4-5 years" for efficient system functioning.

Items in Question #8 receiving the most demand are (l) call waiting indication (7%), (i) automatic route selection (6%), (k) call hold (6%), (p) hunting (6%), (r) intercom (6%), (t) pushbutton dialing (6%), (cc) speed dialing (6%), (q) individual call transfer (5%), (j) call forwarding (4%), (w) traffic measurement (4%), (w) queueing (4%), (bb) add-on conference (4%), and (ee) camp-on (4%). Three percent indicate (b) attendant busy lamp field, (o) direct-in-dialing, (v) WATS timing, (y) out-of-hours arrangements, and (z) speaker phones. No other item received more than 2 percent of the responses.

Total responses for out-of-town agencies are as follows. Question #1: 33 percent "0-2," 35 percent "3-10," and 32 percent "11+." This adds up to 67 percent of the respondents using the telephone 3 or more times daily. Only 27 percent are calling long distance 3 or more times daily. The problem cited as "Most Frequent" is "System busy" (24%). "Often" encountered problems are "System busy" (30%), "Escalating costs" (15%) and "System interference" (14%). Other problems are encountered "Infrequently" by 91-99 percent of the respondents.

Question #4a received 64 percent "Yes" for acceptability of WATS calls without a busy signal, and Question #4b has 79 percent "Yes" for in-house calls. Sixty-three percent indicate system growth, and 70 percent indicate that a new or upgraded system is not needed. Responses to Question #7 are: 10 percent "1 year," 35 percent "2-3 years," and 55 percent "4-5 years."

Items in Question #8 are as follows: (k) call hold, (l) call waiting indication, and (p) hunting each receive 6 percent. Five percent items are (r) intercom, (t) pushbutton dialing, and (i) automatic route selection. Add-on conference (b) and (cc) speed dialing have 4 percent each, and 3 percent each are: (b) attendant busy lamp field, (c) attendant conference, (g) automatic dialers, (j) call forwarding, (o) direct-in-dialing, (q) individual call transfer, (s) power failure capability, (v) WATS timing, (x) intercept, (gg) distinctive ringing, and (jj) training program.

Table 6 displays the results obtained from personal interviews with the 19 Helena-based department representatives. Very few variations in answers or perceptions are evident. The only "Very Frequent" problem is "Escalating costs." About one-half of the interview respondents feel that the WATS line is busy an unacceptable percentage of the time, and three-fourths feel that in-house calls are <u>not</u> busy too often.

Question #8 items selected by 15 or more respondents as being necessary features are: (k) call hold, (q) individual call transfer, (r) intercom, (t) pushbutton dialing, and (v) WATS timing. Features selected by 6-8 representatives include: (c) attendant conference, (j) call forwarding, (w) queueing, (aaa) attendant centralized service and (eee) call pickup. Call waiting indication (l), (n) data privacy, (cc) speed dialing and (kk) installation program are selected by 5 persons. Other features receiving 3 or 4 requests are: (h) automatic identification of outward dialing, (m) customer administration center, (o) direct-in-dialing, (p) hunting, (s) power failure capability, (x) intercept, (z) speaker phones, (aa) message centers, (bb) add-on-conference, (dd) system test facilities, (ff) line lockout/tone denial, (gg) distinctive ringing, (ii) system feature cancellation, (jj) training program, (ll) interconnection plans,

(ccc) interface for long-distance calling, (ddd) call park, (fff) call transfer, (iii) line lockout with warning, (jjj) loudspeaker, and (ppp) data communication access. No other items were selected by more than 2 people as being "Necessary."

Results are also presented in detailed form, categorized by agency and by location. These are presented in Tables 7 through 30.

University and college responses are in Tables 31-35, presented individually.

Montana State University respondents are primarily concerned with "System busy" and with "Escalating costs." Access to WATS lines is not as acceptable as access to in-house lines; the system has grown in the past 5 years; and very few respondents feel the need for a new or upgraded system. Automatic route selection (i), (q) individual call transfer, (j) call forwarding, (k) call hold, (p) hunting, (r) intercom, (t) pushbutton dialing, and (z) speaker phones are selected by 4 or more of the 14 respondents.

Twenty-two University of Montana employees returned the questionnaire. "System busy" and "Escalating costs" are problems, as are "System interference," "Incorrect billing," and "Inaccurate or misleading information from vendors." WATS line accessibility is viewed as inadequate by 6 respondents, in-house lines appear acceptable. The system has grown in the past 5 years and 10 respondents feel that a new or upgraded system is needed. Six employees feel they can function efficiently with the existing system for only one year. Seven state "2-3 years," and eight "4-5 years." Features selected by seven or more respondents are: (b) attendant busy lamp field, (d) attendant direct station selection, (g) automatic dialers, (i) automatic route selection, (j) call forwarding, (k) call hold, (l) call waiting indication, (p) hunting, (q) individual call transfer, (r) intercom, (t) pushbutton dialing, (v) WATS timing, (w) queueing, (y) out-of-hours arrangements, (z) speaker phones, (bb) add-on-conference, and (cc) speed dialing.

Seventeen employees of Eastern Montana College returned the questionnaire. There, "System busy" is the prime concern. "System interference," "Escalating costs," "Inadequate possibilities for expanding system," "Poor turnaround time for labor" are also listed as Very Frequent problems.

Five respondents are dissatisfied with accessibility of WATS lines, but only one finds in-house call lines too busy. The system has grown, and 9 employees feel that a new or upgraded telephone system is necessary. Five want it in "1 year," eight can function efficiently "2-3 years," and only four selected "4-5 years."

Features selected by six or more respondents are: (b) automatic route selection, (j) call forwarding, (k) call hold, (l) call waiting indication, (p) hunting, (q) individual call transfer, (r) intercom, (t) pushbutton dialing, (y) out-of-hours arrangements, (z) speaker phones, and (bb) add-on-conference.

Western Montana College employees returned only 2 questionnaires. Both respondents are heavy telephone users (11+ times/day). The only concern indicated is "System busy," but neither feel that it is busy an unacceptable percentage of the time. One respondent feels the need for a new or upgraded system within a year. Features selected by both are: (f) attendant recall, (j) call forwarding, (l) call waiting, (q) individual call transfer, (t) pushbutton dialing, (y) out-of-hours arrangements and (gg) distinctive ringing.

Montana College of Mineral Sciences and Technology has four respondents. Two are 11+ times/day telephone users. Only two problems are indicated, "System busy" and "System interference." One respondent feels that WATS accessibility is inadequate. The telephone system has grown, and all four respondents feel the need for a new or upgraded system. But all also indicate that they can function efficiently for "4-5 years" with their present system. Speed dialing (cc) is the only feature selected by more than one person.

TABLE 3 TELEPHONY NEEDS ASSESSMENT RESPONSE TOTALS:

CATEGORY TOTAL: AGENCY RESPONSES (excepting universities and colleges)

TOTAL NUMBER OF PARTICIPANTS 153

	0-2	%	3-10	%	11+	%	
1.	32	22	54	36	63	42	Average number of times per day that you use the State of Montana telephones
2.	81	53	69	45	3	2	Average number of out-of-town calls you make per day
	1	%	2	%	3	%	
3.							Problems encountered when using state telephone system:
a	120	90	9	7	4	3	System out of order
b	51	36	54	38	36	26	System busy
c	106	78	21	15	9	7	System interference
d	98	90	5	5	5	5	Poor turnaround times for labor orders
e	80	93	4	5	2	2	Incorrect billings
f	86	95	4	4	1	1	Inaccurate or misleading information from vendor
g	64	67	19	20	13	13	Escalating costs
h	68	82	9	11	6	7	Inadequate possibilities for expanding system
	Yes	%	No	%			
4.							Does your organization's telephone system:
a	87	66	45	34			Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	125	86	20	14			Permit an acceptable percentage of in-house calls to go through (without a busy signal)?
5.	90	72	35	28			Has your telephone system grown in last 5 years?
6.	51	37	87	63			Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	%	2-3 yrs	%	4-5 yrs	%	
7.	25	20	50	39	53	41	How long do you feel you can continue functioning efficiently with the system you currently possess?

Telephony Needs Assessment Response Totals

	Mail Survey	%	
8a	7	1	Area code restriction
b	26	3	Attendant busy lamp field
c	18	2	Attendant conference
d	10	1	Attendant direct station selection
e	6	1	Attendant intercept
f	13	2	Attendant recall
g	24	3	Automatic dialers
h	12	2	Automatic identification of outward dialing
i	42	5	Automatic route selection
j	29	4	Call forwarding
k	47	6	Call hold
l	50	7	Call waiting indication
m	8	1	Customer administration center
n	13	2	Data privacy
o	22	3	Direct-in-dialing
p	45	6	Hunting
q	34	4	Individual call transfer
r	46	6	Intercom
s	15	2	Power failure capability
t	41	5	Pushbutton dialing
u	9	1	Traffic measurement
v	21	3	WATS timing
w	25	3	Queueing
x	15	2	Intercept
y	17	2	Out-of-hours arrangements
z	19	23	Speaker phones
aa	9	1	Message centers
bb	35	4	Add-on-conference
cc	41	5	Speed dialing
dd	7	1	System test facilities
ee	25	3	Camp-on

(continued)

Telephony Needs Assessment Response Totals

	Mail Survey	%	
ff	3	<1	Line lockout/tone denial
gg	17	2	Distinctive ringing
hh	5	<1	Immediate system response
ii	3	<1	System feature cancellation
jj	19	2	Training program
kk	7	1	Installation program
ll	5	<1	Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	%	No	%
36	51	34	49

TABLE 4 TELEPHONY NEEDS ASSESSMENT RESPONSE TOTALS:

CATEGORY HELENA AGENCIES

TOTAL NUMBER OF PARTICIPANTS 93

	0-2	%	3-10	%	11+	%	
1.	13	14	34	37	45	49	Average number of times per day that you use the State of Montana telephones
2.	37	40	54	58	2	2	Average number of out-of-town calls you make per day
	1	%	2	%	3	%	
3.							Problems encountered when using state telephone system:
a	74	89	6	7	3	4	System out of order
b	28	31	39	43	24	26	System busy
c	65	77	14	16	6	7	System interference
d	58	91	2	3	4	6	Poor turnaround times for labor orders
e	45	90	3	6	2	4	Incorrect billings
f	49	92	3	6	1	2	Inaccurate or misleading information from vendor:
g	31	55	13	23	12	22	Escalating costs
h	39	76	7	14	5	10	Inadequate possibilities for expanding system
	Yes	%	No	%			
4.							Does your organization's telephone system:
a	59	67	29	33			Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	77	89	10	11			Permit an acceptable percentage of in-house calls to go through (without a busy signal)?
5.	58	78	16	22			Has your telephone system grown in last 5 years?
6.	35	41	50	59			Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	%	2-3 yrs	%	4-5 yrs	%	
7.	20	26	32	42	25	32	How long do you feel you can continue functioning efficiently with the system you currently possess?

Telephony Needs Assessment Response Totals

	Mail Survey	%	
8a	4	<1	Area code restriction
b	18	3	Attendant busy lamp field
c	10	2	Attendant conference
d	4	<1	Attendant direct station selection
e	3	<1	Attendant intercept
f	9	2	Attendant recall
g	15	3	Automatic dialers
h	7	1	Automatic identification of outward dialing
i	29	6	Automatic route selection
j	20	4	Call forwarding
k	30	6	Call hold
l	34	7	Call waiting indication
m	5	1	Customer administration center
n	8	2	Data privacy
o	13	3	Direct-in-dialing
p	30	6	Hunting
q	27	5	Individual call transfer
r	33	6	Intercom
s	8	2	Power failure capability
t	28	6	Pushbutton dialing
u	4	<1	Traffic measurement
v	13	3	WATS timing
w	19	4	Queueing
x	6	1	Intercept
y	13	3	Out-of-hours arrangements
z	13	3	Speaker phones
aa	7	1	Message centers
bb	23	4	Add-on-conference
cc	30	6	Speed dialing
dd	4	<1	System test facilities
ee	19	4	Camp-on

(continued)

Telephony Needs Assessment Response Totals

	Mail Survey	%	
ff	2	<1	Line lockout/tone denial
gg	9	2	Distinctive ringing
hh	3	<1	Immediate system response
ii	2	<1	System feature cancellation
jj	12	2	Training program
kk	4	<1	Installation program
ll	2	<1	Interconnection plans

TABLE 5. TELEPHONY NEEDS ASSESSMENT RESPONSE TOTALS:

CATEGORY TOTAL: OUT-OF-TOWN AGENCIES (excepting universities and colleges)

TOTAL NUMBER OF PARTICIPANTS 60

	0-2	%	3-10	%	11+	%	
1.	19	33	20	35	18	32	Average number of times per day that you use the State of Montana telephones
2.	44	73	15	25	1	2	Average number of out-of-town calls you make per day
	1	%	2	%	3	%	
3.							Problems encountered when using state telephone system:
a	46	92	3	6	1	2	System out of order
b	23	46	15	30	12	24	System busy
c	41	80	7	14	3	6	System interference
d	40	91	3	7	1	2	Poor turnaround times for labor orders
e	35	97	1	3	-		Incorrect billings
f	37	97	1	3	-		Inaccurate or misleading information from vendor
g	33	83	6	15	1	2	Escalating costs
h	29	91	2	6	1	3	Inadequate possibilities for expanding system
	Yes	%	No	%			
4.							Does your organization's telephone system:
a	28	64	16	36			Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	38	79	10	21			Permit an acceptable percentage of in-house calls to go through (without a busy signal)?
5.	32	63	19	37			Has your telephone system grown in last 5 years?
6.	16	30	37	70			Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	%	2-3 yrs	%	4-5 yrs	%	
7.	5	10	18	35	28	55	How long do you feel you can continue functioning efficiently with the system you currently possess?

Telephony Needs Assessment Response Totals

	Mail Survey	%	
8a	3	1	Area code restriction
b	8	3	Attendant busy lamp field
c	8	3	Attendant conference
d	6	2	Attendant direct station selection
e	3	1	Attendant intercept
f	4	2	Attendant recall
g	9	3	Automatic dialers
h	5	2	Automatic identification of outward dialing
i	13	5	Automatic route selection
j	9	3	Call forwarding
k	17	6	Call hold
l	16	6	Call waiting indication
m	3	1	Customer administration center
n	5	2	Data privacy
o	9	3	Direct-in-dialing
p	15	6	Hunting
q	7	3	Individual call transfer
r	13	5	Intercom
s	7	3	Power failure capability
t	13	5	Pushbutton dialing
u	5	2	Traffic measurement
v	8	3	WATS timing
w	6	2	Queueing
x	9	3	Intercept
y	4	2	Out-of-hours arrangements
z	6	2	Speaker phones
aa	2	1	Message centers
bb	12	4	Add-on-conference
cc	11	4	Speed dialing
dd	3	1	System test facilities
ee	6	2	Camp-on

(continued)

Telephony Needs Assessment Response Totals

	Mail Survey	%	
ff	1	<1	Line lockout/tone denial
gg	8	3	Distinctive ringing
hh	2	1	Immediate system response
ii	1	<1	System feature cancellation
jj	7	3	Training program
kk	3	1	Installation program
ll	3	1	Interconnection plans

TABLE 6. TELEPHONY NEEDS ASSESSMENT RESPONSE TOTALS:

CATEGORY TOTAL: PERSONAL INTERVIEW RESPONSES

TOTAL NUMBER OF PARTICIPANTS 19

	0-2	%	3-10	%	11+	%	
1.							Average number of times per day that you use the State of Montana telephones
2.							Average number of out-of-town calls you make per day
	1	%	2	%	3	%	
3.							Problems encountered when using state telephone system:
a	17		2		0		System out of order
b	13		3		3		System busy
c	16		2		1		System interference
d	17		1		1		Poor turnaround times for labor orders
e	18		1		0		Incorrect billings
f	17		2		0		Inaccurate or misleading information from vendor:
g	0		0		19		Escalating costs
h	16		1		2		Inadequate possibilities for expanding system
	Yes	%	No	%			
4.							Does your organization's telephone system:
a	10		9				Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	15		4				Permit an acceptable percentage of in-house calls to go through (without a busy signal)?
5.							Has your telephone system grown in last 5 years?
6.							Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	%	2-3 yrs	%	4-5 yrs	%	
7.	5		2		12		How long do you feel you can continue functioning efficiently with the system you currently possess?

Telephony Needs Assessment Response Totals

	Necessary	Very Desirable	
8a	2	-	Area code restriction
b	-	-	Attendant busy lamp field
c	6	3	Attendant conference
d	-	-	Attendant direct station selection
e	2	1	Attendant intercept
f	2	2	Attendant recall
g	-	4	Automatic dialers
h	3	3	Automatic identification of outward dialing
i	2	1	Automatic route selection
j	7	2	Call forwarding
k	16	-	Call hold
l	5	1	Call waiting indication
m	3	2	Customer administration center
n	5	-	Data privacy
o	4	-	Direct-in-dialing
p	3	1	Hunting
q	15	-	Individual call transfer
r	15	-	Intercom
s	3	2	Power failure capability
t	15	-	Pushbutton dialing
u	2	-	Traffic measurement
v	15	-	WATS timing
w	8	3	Queueing
x	3	-	Intercept
y	-	-	Out-of-hours arrangements
z	4	2	Speaker phones
aa	3	1	Message centers
bb	4	-	Add-on-conference
cc	5	2	Speed dialing
dd	4	1	System test facilities
ee	1	-	Camp-on

(continued)

Telephony Needs Assessment Response Totals

		Necessary	Very Desirable	
ff		3	-	Line lockout/tone denial
gg		4	2	Distinctive ringing
hh		1	-	Immediate system response
ii		3	1	System feature cancellation
jj		4	-	Training program
kk		5	-	Installation program
ll		3	-	Interconnection plans
	aaa	6	1	Attendant centralized service
	bbb	1	2	Attendant console
	ccc	3	1	Interface for long-distance calling
	ddd	3	-	Call park
	eee	6	-	Call pickup
	fff	3	2	Call transfer
	ggg	2	-	Emergency access to attendant
	hhh	1	-	Executive override
	iii	3	1	Line lockout with warning
	jjj	3	2	Loudspeaker
	kkk	2	1	Miscellaneous trunk restrictions
	lll	-	3	Radio paging
	mmm	2	3	Recorded telephone dictation access
	nnn	1	-	Timed recall on outgoing calls
	ooo	0	2	Station restriction features
	ppp	4	1	Data communication access
	qqq	2	-	Data restriction
	rrr	1	-	Private line terminal

TABLE 7 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION ADMINISTRATION

1979-80 Telephone Expenditures $72,072.36

Interview Respondent Ted Whitling

Job Title Administrator, Communications Division

Number of Questionnaires Mailed 22

Number of Questionnaires Returned 12 (Helena agencies)

-- (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	2	4	5	Average number times per day you use State of Montana telephones
2.	7	4		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	9*	1		System out of order
b	6*	4	2	System busy
c	8	2*		System interference
d	5*		1	Poor turnaround times for labor orders
e	4*			Incorrect billings
f	4	1*		Inaccurate or misleading information from vendors
g	4	1		Escalating costs
h	3	1*	1	Inadequate possibilities for expanding system
	Yes	No		
4a	10	2*		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	12*			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	8			Has your telephone system grown in last 5 years?
6.	8	4		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	5*	4	2	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	-	*		Area code restriction
b	6			Attendant busy lamp field
c	2	*		Attendant conference
d				Attendant direct station selection
e	1	*		Attendant intercept
f	1	*		Attendant recall
g	1			Automatic dialers
h		*		Automatic identification of outward dialing
i	3	*		Automatic route selection
j	2	*		Call forwarding
k	5	*		Call hold
l	5	*		Call waiting indication
m	2	*		Customer administration center
n		*		Data privacy
o	4	*		Direct-in-dialing
p	5	*		Hunting
q	4	*		Individual call transfer
r	7	*		Intercom
s		*		Power failure capability
t	6	*		Pushbutton dialing
u		*		Traffic measurement
v	1	*		WATS timing
w	1	*		Queueing
x		*		Intercept
y	2	*		Out-of-hours arrangements
z	5	*		Speaker phones
aa	1	*		Message centers
bb	2	*		Add-on-conference
cc	5		*	Speed dialing
dd		*		System test facilities
ee	4			Camp-on
ff		*		Line lockout/tone denial
gg	2	*		Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1	*		Immediate system response
ii		*		System feature cancellation
jj	2			Training program
kk	1	*		Installation program
ll	1	*		Interconnection plans
aaa		*		Attendant centralized service
bbb		*		Attendant console
ccc			*	Interface for long-distance calling
ddd		*		Call park
eee		*		Call pickup
fff		*		Call transfer
ggg			*	Emergency access to attendant
hhh			*	Executive override
iii		*		Line lockout with warning
jjj		*		Loudspeaker
kkk				Miscellaneous trunk restrictions
lll				Radio paging
mmm				Recorded telephone dictation access
nnn				Timed recall on outgoing calls
ooo			*	Station restriction features
ppp				Data communication access
qqq				Data restriction
rrr				Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
4	1

Mail Survey Comments

ADMINISTRATION

Telephone not used very often; job doesn't require it.

Need better com line system.

Data: The division is responsible for administering the teleprocessing data network. Currently approximately 75 separate bills are received each month. A combined statement for the data circuits would reduce significantly the amount of clerical work required to monitor and pay the monthly charge.
Voice: Difficult to determine validity of invoice. We are not billed from telephone company. Invoice initiated by Comm. Division - in totals only.

Improve the method for handling incoming emergency calls--i.e., data line out of service. Routing calls from central point to individual station.

Agencies are required to budget for communication costs to be incurred over a two-year period. Rate increases are authorized to be effective at any time. With the size of our expenditures for voice and data, a significant increase can cause a significant impact on our budget.

System effective for my purposes.

I have a phone in my office (supervisor). In the working section there is one phone for 30-40 people.

System becoming inadequate--can't handle out-of-town calls, especially on first access.

Operators don't always pick up on a transfer signal. Incoming callers that need to be transferred to another office are often hung up on.

If we are on a line and we get another call, the receptionist should get a busy signal when she rings us.

Trying to contact someone is difficult when one out of five people are on another line and you can't get through the com-line.

Configuration of office space requires some system modifications.

To handle outgoing calls need PA system in building.

Personal Interview Comments

Telephone System Manager(s) Communications Division

Has the trend in management problems become more serious over time?

Yes

Has your telephone system grown in the past five years?

Growth has paralleled increases in employees. Telephone usage has increased as travel is decreased.

What, if any, changes in the department do you expect?

None anticipated.

Additional comments:

After the 9/81 rate increase, the existing equipment will be obsolete relative to new equipment cost effectiveness and flexibility.

TABLE 8 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION AGRICULTURE: TOTAL

1979-80 Telephone Expenditures _____

Interview Respondent Mary Evans

Job Title Administrator, Centralized Services

Number of Questionnaires Mailed 3

Number of Questionnaires Returned 1 (Helena agencies)

2 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	2			Average number times per day you use State of Montana telephones
2.	2			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2*			System out of order
b	2*			System busy
c	2*			System interference
d	2		*	Poor turnaround times for labor orders
e	2*			Incorrect billings
f	1*	1		Inaccurate or misleading information from vendors
g	1	1	*	Escalating costs
h	2*			Inadequate possibilities for expanding system
	Yes	No		
4a	2*			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1*	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		2		Has your telephone system grown in last 5 years?
6.		2		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			1*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h		*		Automatic identification of outward dialing
i	1			Automatic route selection
j		*		Call forwarding
k				Call hold
l				Call waiting indication
m		*		Customer administration center
n		*		Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s	1			Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w		*		Queueing
x	1			Intercept
y	1			Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc		*		Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 8a. SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION AGRICULTURE (HELENA)

1979-80 Telephone Expenditures $26,550.23

Number of Questionnaires Mailed 3

Number of Questionnaires Returned 1 (Helena agencies)

2 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.				Average number times per day you use State of Montana telephones
2.				Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b	1			System busy
c	1			System interference
d			1	Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g			1	Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.				Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.				How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h	1			Automatic identification of outward dialing
i				Automatic route selection
j	1			Call forwarding
k				Call hold
l				Call waiting indication
m	1			Customer administration center
n	1			Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w	1			Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc	1			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 8b. SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION AGRICULTURE (BUTTE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 3

Number of Questionnaires Returned 1 (Helena agencies)

2 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1			Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b	1			System busy
c	1			System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f		1		Inaccurate or misleading information from vendors
g		1		Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b		1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		1		Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.				How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x	1			Intercept
y	1			Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 8c SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION AGRICULTURE (GREAT FALLS)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 3

Number of Questionnaires Returned 1 (Helena agencies)

2 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1			Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b	1			System busy
c	1			System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1			Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		1		Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Personal Interview Comments

Telephone System Manager(s) Central Services personnel

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

The growth has been small, and in keeping with the increased numbers of employees.

What, if any, changes in the department do you expect?

None anticipated.

Additional comments:

A data terminal has been requested for the Pesticide Division.

WATS out-access seems to be better than in-access.

It takes the capitol operator a long time to answer a call, and makes call transfers unnecessarily long.

TABLE 9. SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION STATE AUDITOR

1979-80 Telephone Expenditures $19,408.02

Interview Respondent Roy L. Phelps

Job Title Deputy State Auditor, Administrative Division

Number of Questionnaires Mailed 1

Number of Questionnaires Returned 0 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.				Average number times per day you use State of Montana telephones
2.				Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	*			System out of order
b	*			System busy
c	*			System interference
d	*			Poor turnaround times for labor orders
e	*			Incorrect billings
f	*			Inaccurate or misleading information from vendors
g			*	Escalating costs
h	*			Inadequate possibilities for expanding system
	Yes	No		
4a	*			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	*			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.				Has your telephone system grown in last 5 years?
6.				Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k		*		Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q		*		Individual call transfer
r		*		Intercom
s				Power failure capability
t		*		Pushbutton dialing
u				Traffic measurement
v		*		WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Personal Interview Comments

Telephone System Manager(s) Deputy State Auditor

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

No significant growth.

What, if any, changes in the department do you expect?

None anticipated.

Additional comments:

The intercom system is unsatisfactory. It rings at all desks but is answerable at only one.

Excepting the intercom, the existing system is very functional and adequate.

TABLE 10 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION STATE BOARD OF EDUCATION

1979-80 Telephone Expenditures $3,044.93

Number of Questionnaires Mailed 3

Number of Questionnaires Returned 3 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1	2		Average number times per day you use State of Montana telephones
2.	1	2		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone syste
3a	2			System out of order
b	1		1	System busy
c	2			System interference
d	2			Poor turnaround times for labor orders
e	2	1		Incorrect billings
f	2			Inaccurate or misleading information from vendors
g	1	1		Escalating costs
h	1	1		Inadequate possibilities for expanding system

	Yes	No	
4a	2	1	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2	1	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	2	1	Has your telephone system grown in last 5 years?
6.	3		Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.	2			How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d	1			Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j				Call forwarding
k	2			Call hold
l	2			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	1			Hunting
q				Individual call transfer
r	2			Intercom
s	1			Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v	1			WATS timing
w	1			Queueing
x	1			Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

aaa			Attendant centralized service
bbb			Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee			Call pickup
fff			Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
0	0

Mail Survey Comments

When we get settled in a permanent office, we will probably need an additional line and intercom.

Our department (Museum) will have almost twice the number of staff come July 1st.

Present system will not add any more incoming lines or intercom lines.

TABLE 11 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION FISH, WILDLIFE & PARKS: TOTAL

1979-80 Telephone Expenditures _____

Interview Respondent Sharon Garden

Job Title Executive Secretary, Director's Office

Number of Questionnaires Mailed 19

Number of Questionnaires Returned 4 (Helena agencies)

3 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	3	3	1	Average number times per day you use State of Montana telephones
2.	3	4		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	7*			System out of order
b	2*	3	2	System busy
c	5*	2		System interference
d	7*			Poor turnaround times for labor orders
e	6*	1		Incorrect billings
f	7*			Inaccurate or misleading information from vendors
g	6	1	*	Escalating costs
h	4*	1		Inadequate possibilities for expanding system
	Yes	No		
4a	3*	2		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	4*	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	4	3		Has your telephone system grown in last 5 years?
6.	1	6		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	*	3	3	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c	1	*		Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f		*		Attendant recall
g	1			Automatic dialers
h	1	*		Automatic identification of outward dialing
i	2	*		Automatic route selection
j		*		Call forwarding
k	2	*		Call hold
l	1	*		Call waiting indication
m		*		Customer administration center
n	1	*		Data privacy
o	1	*		Direct-in-dialing
p	2	*		Hunting
q	2	*		Individual call transfer
r	2	*		Intercom
s				Power failure capability
t	2	*		Pushbutton dialing
u				Traffic measurement
v	2	*		WATS timing
w		*		Queueing
x		*		Intercept
y				Out-of-hours arrangements
z	1	*		Speaker phones
aa		*		Message centers
bb	1	*		Add-on-conference
cc	2	*		Speed dialing
dd		*		System test facilities
ee	1			Camp-on
ff		*		Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii		*		System feature cancellation
jj		*		Training program
kk		*		Installation program
ll		*		Interconnection plans

aaa		*	Attendant centralized service
bbb			Attendant console
ccc	*		Interface for long-distance calling
ddd	*		Call park
eee			Call pickup
fff			Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii	*		Line lockout with warning
jjj		*	Loudspeaker
kkk			Miscellaneous trunk restrictions
lll		*	Radio paging
mmm		*	Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp		*	Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

TABLE 11a SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION FISH, WILDLIFE & PARKS (HELENA)

1979-80 Telephone Expenditures $88,894.83

Number of Questionnaires Mailed 19

Number of Questionnaires Returned 4 (Helena agencies)

3 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1	2	1	Average number times per day you use State of Montana telephones
2.	1	3		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	4			System out of order
b	1	2	1	System busy
c	3	1		System interference
d	4			Poor turnaround times for labor orders
e	4			Incorrect billings
f	4			Inaccurate or misleading information from vendors
g	3	1		Escalating costs
h	2	1		Inadequate possibilities for expanding system
	Yes	No		
4a	2	2		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	3	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	3	1		Has your telephone system grown in last 5 years?
6.		4		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		2	1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h	1			Automatic identification of outward dialing
i	2			Automatic route selection
j				Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n	1			Data privacy
o	1			Direct-in-dialing
p	2			Hunting
q	2			Individual call transfer
r	1			Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v	1			WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

Mail Survey Comments

System good as is!

I have two more basic problems with the phone itself: first, the connector box on the wall is always falling off. Second, the cord is always twisting and drives me nuts. How about a recording answering service for after-hours calls?

Miles City. Present system is outdated, WATS interference is frequent, and new intercom system is needed. Out-of-state WATS capability would be beneficial.

Fairfield. Our office does not have WATS or STS capability at this time.

Personal Interview Comments

Telephone System Manager(s) Centralized Services Division

Has the trend in management problems become more serious over time?

The existing system is inadequate, and problems are compounded over the passage of time.

Has your telephone system grown in the past five years?

Office reorganization, increased employees, and physical moves have necessitated adding 4-5 two-way lines.

What, if any, changes in the department do you expect?

None anticipated.

Additional comments:

The FWP headquarters in Kalispell is installing a new telephone system.

Glasgow has no WATS access, which hinders communications.

Personnel would like to have a more efficient MSTS than currently exists.

TABLE 11b SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION FISH, WILDLIFE & PARKS (FIELD)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 19

Number of Questionnaires Returned 4 (Helena agencies)

3 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	2	1		Average number times per day you use State of Montana telephones
2.	2	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	3			System out of order
b	1	1	1	System busy
c	2	1		System interference
d	3			Poor turnaround times for labor orders
e	2	1		Incorrect billings
f	3			Inaccurate or misleading information from vendors
g	3			Escalating costs
h	2			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1	2		Has your telephone system grown in last 5 years?
6.	1	2		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1	2	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c	1			Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k	1			Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r	1			Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v	1			WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 12. SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION FIRE TRAINING SCHOOL (GREAT FALLS)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 1

Number of Questionnaires Returned _____ (Helena agencies)

1 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		1		Average number times per day you use State of Montana telephones
2.		1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b			1	System busy
c			1	System interference
d	1			Poor turnaround times for labor orders
e				Incorrect billings
f				Inaccurate or misleading information from vendors
g			1	Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a		1		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.	1			Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1		How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c	1			Attendant conference
d	1			Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc	1			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Mail Survey Comments

Great Falls: At times (all too frequently) it is almost impossible to get on the system.

TABLE 13 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION OFFICE OF THE GOVERNOR

1979-80 Telephone Expenditures $56,004.42

Interview Respondent David Wanzenreid

Job Title Executive Assistant

Number of Questionnaires Mailed 2

Number of Questionnaires Returned 1 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.		1		Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1*			System out of order
b	1*			System busy
c	1*			System interference
d	1*			Poor turnaround times for labor orders
e	1*			Incorrect billings
f	1*			Inaccurate or misleading information from vendors
g		1	*	Escalating costs
h	1*			Inadequate possibilities for expanding system
	Yes	No		
4a	1*			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1*			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1	*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c	1		*	Attendant conference
d				Attendant direct station selection
e		*		Attendant intercept
f			*	Attendant recall
g			*	Automatic dialers
h			*	Automatic identification of outward dialing
i			*	Automatic route selection
j			*	Call forwarding
k	1	*		Call hold
l	1		*	Call waiting indication
m			*	Customer administration center
n				Data privacy
o		*		Direct-in-dialing
p			*	Hunting
q		*		Individual call transfer
r		*		Intercom
s			*	Power failure capability
t	1	*		Pushbutton dialing
u		*		Traffic measurement
v		*		WATS timing
w		*		Queueing
x	1		*	Intercept
y				Out-of-hours arrangements
z		*		Speaker phones
aa		*		Message centers
bb		*		Add-on-conference
cc			*	Speed dialing
dd			*	System test facilities
ee		*		Camp-on
ff		*		Line lockout/tone denial
gg			*	Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii			*	System feature cancellation
jj		*		Training program
kk		*		Installation program
ll		*		Interconnection plans

aaa	*		Attendant centralized service
bbb		*	Attendant console
ccc	*		Interface for long-distance calling
ddd	*		Call park
eee	*		Call pickup
fff		*	Call transfer
ggg			Emergency access to attendant
hhh		*	Executive override
iii	*		Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll		*	Radio paging
mmm		*	Recorded telephone dictation access
nnn		*	Timed recall on outgoing calls
ooo		*	Station restriction features
ppp	*		Data communication access
qqq	*		Data restriction
rrr	*		Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No

Personal Interview Comments

Telephone System Manager(s) Executive Assistant

Has the trend in management problems become more serious over time?

Existing system is very satisfactory.

Has your telephone system grown in the past five years?

The Lt. Governor's telephones have been connected to the Governor's. They now have audio conferencing capabilities, and have added 13 telephones.

What, if any, changes in the department do you expect?

None anticipated.

Additional comments:

None.

TABLE 14. SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HEALTH AND ENVIRONMENTAL SCIENCES

1979-80 Telephone Expenditures $13,765.28

Interview Respondent John W. Bartlett

Job Title Deputy Director

Number of Questionnaires Mailed 6

Number of Questionnaires Returned 5 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.			4	Average number times per day you use State of Montana telephones
2.	1	4		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	5*			System out of order
b	*	2	3	System busy
c	5*			System interference
d	5*			Poor turnaround times for labor orders
e	4*	1		Incorrect billings
f	4*			Inaccurate or misleading information from vendors
g	5		*	Escalating costs
h	3*	1		Inadequate possibilities for expanding system

	Yes	No	
4a	2*	2	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2*	3	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	3	1	Has your telephone system grown in last 5 years?
6.	4	1	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.	1	3*		How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c		*		Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f	1			Attendant recall
g			*	Automatic dialers
h	1			Automatic identification of outward dialing
i	1			Automatic route selection
j	1			Call forwarding
k	3	*		Call hold
l	2			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	3			Hunting
q	1	*		Individual call transfer
r	4	*		Intercom
s				Power failure capability
t	2	*		Pushbutton dialing
u	2			Traffic measurement
v	1	*		WATS timing
w	2		*	Queueing
x	2			Intercept
y	2			Out-of-hours arrangements
z	1	*		Speaker phones
aa				Message centers
bb	2	*		Add-on-conference
cc	1			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii				System feature cancellation
jj	1			Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
3	1

Mail Survey Comments

At times it takes awhile to get out on the system.

A busy signal is encountered on 151 calls most of the time.

The only problem I have with the present system is obtaining an open line for in-state WATS calls. Most of the features listed above would not add to my convenience and I assume would be more costly. I am not familiar with present costs and billing, so I am unable to determine its fairness. I believe all unnecessary "frills" should be minimized to obtain the lowest possible rates.

I answer the phone for the Bureau, handling all incoming calls. We do have a problem with insufficient incoming (and out) lines. However, we will be moving to the Cogswell Building the week of June 8th and will have a new telephone system (Horizon system). The new system should remedy the present deficiencies.

Over 40% of our incoming calls get busy signals.

Personal Interview Comments

Telephone System Manager(s) Central Services

Has the trend in management problems become more serious over time?

They are satisfied with the existing system.

Has your telephone system grown in the past five years?

Maternal and Child Health Services Bureau has added the Horizon system. Environmental Sciences Division and Hospital and Medical Facilities Division utilize the Dialog system.

What, if any, changes in the department do you expect?

01 July 81 all of the agencies will be in Cogswell Building.

Additional comments:

Laboratory Division and possibly the entire building needs a loudspeaker system.

TABLE 15 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS: TOTAL

1979-80 Telephone Expenditures $211,289.28

Interview Respondent John L. Prebil

Job Title Administrator, Centralized Services Division

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	14	10	9	Average number times per day you use State of Montana telephones
2.	24	9	1	Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	26	3		System out of order
b	7	10	13	System busy
c	21	5		System interference
d	20	2		Poor turnaround times for labor orders
e	14		1	Incorrect billings
f	14	2		Inaccurate or misleading information from vendors
g	13	1	2	Escalating costs
h	15	2	1	Inadequate possibilities for expanding system
	Yes	No		
4a	16	12		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	25	4		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	17	7		Has your telephone system grown in last 5 years?
6.	14	15		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	6	9	11	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	4			Area code restriction
b	7			Attendant busy lamp field
c	5			Attendant conference
d	2			Attendant direct station selection
e	2			Attendant intercept
f	6			Attendant recall
g	7			Automatic dialers
h	2			Automatic identification of outward dialing
i	10			Automatic route selection
j	8			Call forwarding
k	15			Call hold
l	15			Call waiting indication
m	2			Customer administration center
n	5			Data privacy
o	7			Direct-in-dialing
p	12			Hunting
q	8			Individual call transfer
r	15			Intercom
s	4			Power failure capability
t	10			Pushbutton dialing
u	4			Traffic measurement
v	7			WATS timing
w	6			Queueing
x	3			Intercept
y	2			Out-of-hours arrangements
z	3			Speaker phones
aa	2			Message centers
bb	11			Add-on-conference
cc	11			Speed dialing
dd	4			System test facilities
ee	7			Camp-on
ff	1			Line lockout/tone denial
gg	5			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii	2			System feature cancellation
jj	8			Training program
kk	1			Installation program
ll	1			Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
7	2

TABLE 15a SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (HELENA)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	4	5	5	Average number times per day you use State of Montana telephones
2.	10	4	1	Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	10	2		System out of order
b	3	5	6	System busy
c	9	3		System interference
d	9			Poor turnaround times for labor orders
e	4		1	Incorrect billings
f	4	2		Inaccurate or misleading information from vendors
g	3		2	Escalating costs
h	6	1		Inadequate possibilities for expanding system
	Yes	No		
4a	7	6		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	13	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	7	3		Has your telephone system grown in last 5 years?
6.	6	6		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	4	4	4	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	2			Area code restriction
b	3			Attendant busy lamp field
c	2			Attendant conference
d				Attendant direct station selection
e	1			Attendant intercept
f	4			Attendant recall
g	4			Automatic dialers
h	1			Automatic identification of outward dialing
i	6			Automatic route selection
j	4			Call forwarding
k	8			Call hold
l	7			Call waiting indication
m	1			Customer administration center
n	2			Data privacy
o	4			Direct-in-dialing
p	7			Hunting
q	6			Individual call transfer
r	7			Intercom
s	2			Power failure capability
t	7			Pushbutton dialing
u	2			Traffic measurement
v	2			WATS timing
w	4			Queueing
x				Intercept
y	2			Out-of-hours arrangements
z				Speaker phones
aa	2			Message centers
bb	7			Add-on-conference
cc	8			Speed dialing
dd	2			System test facilities
ee	5			Camp-on
ff	1			Line lockout/tone denial
gg	4			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii	2			System feature cancellation
jj	4			Training program
kk	1			Installation program
ll	1			Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
4	1

Mail Survey Comments

The equipment is either too old, or overloaded, or both.

Little need for above (Question #8) options in my job. For the dept. to operate more efficiently, there are many of the above which could be utilized in different divisions.

Not enough lines for number of persons using phones. Inadequate placement of phones (not in good locations for personnel).

Need more lines with automatic intercept (#8's p)

Cost of old system will become too high.

Easier access to divisions located outside Helena.

Hurry up!

Personal Interview Comments

Telephone System Manager(s) Centralized Services Division and Maintenance Division

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Department is cutting 20% of their telephones, due to costs.

What, if any, changes in the department do you expect?

01 July 81 losing Rail Planning Unit and Travel Promotion Bureau to Dept. of Commerce.

Department has submitted proposed telephony changes, and is waiting for approval from the Communications Division.

They would like the Dimension system.

Additional comments:

TABLE 15b SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (ALL OUT OF TOWN)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	10	5	4	Average number times per day you use State of Montana telephones
2.	14	5		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	16	1		System out of order
b	4	5	7	System busy
c	12	2		System interference
d	11	2		Poor turnaround times for labor orders
e	10			Incorrect billings
f	10			Inaccurate or misleading information from vendors
g	10	1		Escalating costs
h	9	1	1	Inadequate possibilities for expanding system
	Yes	No		
4a	9	6		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	12	3		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	10	4		Has your telephone system grown in last 5 years?
6.	8	9		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	2	5	7	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	2			Area code restriction
b	4			Attendant busy lamp field
c	3			Attendant conference
d	2			Attendant direct station selection
e	1			Attendant intercept
f	2			Attendant recall
g	3			Automatic dialers
h	1			Automatic identification of outward dialing
i	4			Automatic route selection
j	4			Call forwarding
k	7			Call hold
l	8			Call waiting indication
m	1			Customer administration center
n	3			Data privacy
o	3			Direct-in-dialing
p	5			Hunting
q	2			Individual call transfer
r	8			Intercom
s	2			Power failure capability
t	3			Pushbutton dialing
u	2			Traffic measurement
v	5			WATS timing
w	2			Queueing
x	3			Intercept
y				Out-of-hours arrangements
z	3			Speaker phones
aa				Message centers
bb	4			Add-on-conference
cc	3			Speed dialing
dd	2			System test facilities
ee	2			Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
3	1

TABLE 15c SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (BILLINGS)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	2	2		Average number times per day you use State of Montana telephones
2.	4	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	3			System out of order
b		1	2	System busy
c	3			System interference
d	2			Poor turnaround times for labor orders
e	2			Incorrect billings
f	2			Inaccurate or misleading information from vendors
g	2			Escalating costs
h	1		1	Inadequate possibilities for expanding system
	Yes	No		
4a	1	2		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	3			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	2	1		Has your telephone system grown in last 5 years?
6.	3			Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	2	1		How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c	1			Attendant conference
d	1			Attendant direct station selection
e	1			Attendant intercept
f	1			Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j	1			Call forwarding
k	2			Call hold
l	2			Call waiting indication
m	1			Customer administration center
n	1			Data privacy
o	1			Direct-in-dialing
p	2			Hunting
q	2			Individual call transfer
r	3			Intercom
s	2			Power failure capability
t	2			Pushbutton dialing
u				Traffic measurement
v	3			WATS timing
w				Queueing
x	1			Intercept
y				Out-of-hours arrangements
z	2			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk				Installation program
ll				Interconnection plans

Mail Survey Comments

BILLINGS: Phone system outdated.

System was not adequate when installed. Hotline system seems to be very inadequate for the amount of employees using phone.

Present system does not adequately handle in and out calls.

TABLE 15d SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (BOZEMAN)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1	1	1	Average number times per day you use State of Montana telephones
2.	1	2		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	3			System out of order
b		2	1	System busy
c	2			System interference
d	2			Poor turnaround times for labor orders
e	2			Incorrect billings
f	2			Inaccurate or misleading information from vendors
g	2			Escalating costs
h	2			Inadequate possibilities for expanding system
	Yes	No		
4a	2			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.	2			Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		2		How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	2			Attendant busy lamp field
c	2			Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	2			Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k	2			Call hold
l	2			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	2			Hunting
q				Individual call transfer
r	2			Intercom
s				Power failure capability
t				Pushbutton dialing
u	2			Traffic measurement
v				WATS timing
w	2			Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc	1			Speed dialing
dd	2			System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	2			Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	0

TABLE 15e SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (BUTTE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	2		1	Average number times per day you use State of Montana telephones
2.	3			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	3			System out of order
b	2			System busy
c	2			System interference
d	2			Poor turnaround times for labor orders
e	2			Incorrect billings
f	2			Inaccurate or misleading information from vendors
g	2			Escalating costs
h	2			Inadequate possibilities for expanding system
	Yes	No		
4a	1	2		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	2	1		Has your telephone system grown in last 5 years?
6.		3		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			3	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	1			Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j				Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n	1			Data privacy
o	1			Direct-in-dialing
p	1			Hunting
q				Individual call transfer
r	1			Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x	1			Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

Mail Survey Comments

BUTTE: Phone system is good.

TABLE 15f SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (GLENDIVE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		2		Average number times per day you use State of Montana telephones
2.	1	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1	1		System out of order
b		1	1	System busy
c	1	1		System interference
d	1			Poor turnaround times for labor orders
e				Incorrect billings
f				Inaccurate or misleading information from vendors
g			1	Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a		1		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		1		Has your telephone system grown in last 5 years?
6.	1	1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	1			Area code restriction
b	1			Attendant busy lamp field
c				Attendant conference
d	1			Attendant direct station selection
e				Attendant intercept
f	1			Attendant recall
g				Automatic dialers
h	1			Automatic identification of outward dialing
i	1			Automatic route selection
j				Call forwarding
k				Call hold
l	1			Call waiting indication
m				Customer administration center
n	1			Data privacy
o	1			Direct-in-dialing
p				Hunting
q				Individual call transfer
r	1			Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v	2			WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 15g SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (GREAT FALLS)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.			2	Average number times per day you use State of Montana telephones
2.	1	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2			System out of order
b			2	System busy
c	1	1		System interference
d	1			Poor turnaround times for labor orders
e				Incorrect billings
f				Inaccurate or misleading information from vendors
g				Escalating costs
h				Inadequate possibilities for expanding system

	Yes	No	
4a	1	1	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b		2	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1		Has your telephone system grown in last 5 years?
6.	2		Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.				How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k	1			Call hold
l	2			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r	1			Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w	1			Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
2	

Mail Survey Comments

GREAT FALLS: We need a better system of transferring calls within this division office complex.

Comment from public: "lines always busy."
Need more than one "talk" line, as it is busy with in-house conversations when calls need to be directed.

TABLE 15h SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (HAVRE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1			Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b			1	System busy
c			1	System interference
d		1		Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g				Escalating costs
h		1		Inadequate possibilities for expanding system

	Yes	No	
4a	1		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		1	Has your telephone system grown in last 5 years?
6.		1	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k	1			Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	1			Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 15i SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (LEWISTOWN)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	2			Average number times per day you use State of Montana telephones
2.	2			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2			System out of order
b	1	1		System busy
c	2			System interference
d	2			Poor turnaround times for labor orders
e	2			Incorrect billings
f	2			Inaccurate or misleading information from vendors
g	2			Escalating costs
h	2			Inadequate possibilities for expanding system
	Yes	No		
4a	2			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	2			Has your telephone system grown in last 5 years?
6.		2		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1	1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j	1			Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 15j SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (MILES CITY)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1			Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b	1			System busy
c	1			System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1			Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1		How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 15k SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION HIGHWAYS (RED LODGE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 63

Number of Questionnaires Returned 15 (Helena agencies)

20 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1			Average number times per day you use State of Montana telephones
2.				Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a				System out of order
b				System busy
c				System interference
d				Poor turnaround times for labor orders
e				Incorrect billings
f				Inaccurate or misleading information from vendors
g				Escalating costs
h				Inadequate possibilities for expanding system

	Yes	No	
4a			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1		Has your telephone system grown in last 5 years?
6.		1	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 16 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION INSTITUTIONS (TOTAL RESPONSE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 77

Number of Questionnaires Returned 3 (Helena agencies)

11 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	3	6	5	Average number times per day you use State of Montana telephones
2.	9	4		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	8			System out of order
b	4	3	2	System busy
c	10	1		System interference
d	11			Poor turnaround times for labor orders
e	8			Incorrect billings
f	8			Inaccurate or misleading information from vendors
g	5	2		Escalating costs
h	8	1		Inadequate possibilities for expanding system
	Yes	No		
4a	11	2		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	11	3		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	8	5		Has your telephone system grown in last 5 years?
6.	2	12		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		8	5	How long do you feel you can continue functioning efficiently with the system you currently possess.

	Mail Survey	Necessary	Very Desirable	
8a	1			Area code restriction
b	3			Attendant busy lamp field
c	3			Attendant conference
d	2			Attendant direct station selection
e	2			Attendant intercept
f	2			Attendant recall
g	3			Automatic dialers
h	2			Automatic identification of outward dialing
i	5			Automatic route selection
j	6			Call forwarding
k	4			Call hold
l	6			Call waiting indication
m	1			Customer administration center
n	2			Data privacy
o	4			Direct-in-dialing
p	3			Hunting
q	3			Individual call transfer
r	3			Intercom
s	4			Power failure capability
t	3			Pushbutton dialing
u	3			Traffic measurement
v	2			WATS timing
w	3			Queueing
x	2			Intercept
y	4			Out-of-hours arrangements
z	2			Speaker phones
aa	1			Message centers
bb	5			Add-on-conference
cc	7			Speed dialing
dd	1			System test facilities
ee	3			Camp-on
ff	1			Line lockout/tone denial
gg	3			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii	1			System feature cancellation
jj	2			Training program
kk	3			Installation program
ll	2			Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
0	5

TABLE 16a SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION INSTITUTIONS (HELENA)

1979-80 Telephone Expenditures $97,279.56

Interview Respondent John Thomas

Job Title Chief, Data and Information Services Bureau

Number of Questionnaires Mailed 77

Number of Questionnaires Returned 3 (Helena agencies)

11 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.		2	1	Average number times per day you use State of Montana telephones
2.		2		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	3*			System out of order
b	2	*	1	System busy
c	2*			System interference
d	3*			Poor turnaround times for labor orders
e	1*			Incorrect billings
f	2*		*	Inaccurate or misleading information from vendors
g		1		Escalating costs
h	2*			Inadequate possibilities for expanding system
	Yes	No		
4a	3	*		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	3*			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	3			Has your telephone system grown in last 5 [illegible]s?
6.		3		Do you feel that your organization needs a [illegible], or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		2	*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	1			Area code restriction
b				Attendant busy lamp field
c		*		Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g			*	Automatic dialers
h				Automatic identification of outward dialing
i	2			Automatic route selection
j	1		*	Call forwarding
k		*		Call hold
l	2			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q		*		Individual call transfer
r				Intercom
s				Power failure capability
t		*		Pushbutton dialing
u				Traffic measurement
v	1	*		WATS timing
w			*	Queueing
x				Intercept
y	1			Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	1	*		Speed dialing
dd				System test facilitie
ee				Camp-on
ff				Line lockout/tone den
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj		*		Training program
kk	1			Installation program
ll				Interconnection plans

aaa		*	Attendant centralized service
bbb		*	Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee	*		Call pickup
fff			Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

Mail Survey Comments

Present phone system is adequate.

Better in-house communication and call transfer.

Personal Interview Comments

Telephone System Manager(s) Director's Administrative Secretary

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

No significant growth.

What, if any, changes in the department do you expect?

The department is decreasing the number of employees, and will eliminate telephones and lines accordingly.

Additional comments:

The department has requested a "busy study."

The existing system is viewed as adequate.

TABLE 16b SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION INSTITUTIONS (BOULDER RIVER SCHOOL)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 14

Number of Questionnaires Returned _____ (Helena agencies)

4 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1	2	1	Average number times per day you use State of Montana telephones
2.	4			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a				System out of order
b		1		System busy
c	4			System interference
d	4			Poor turnaround times for labor orders
e	4			Incorrect billings
f	4			Inaccurate or misleading information from vendors
g	3	1		Escalating costs
h	3	1		Inadequate possibilities for expanding system
	Yes	No		
4a	2	2		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2	2		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	4			Has your telephone system grown in last 5 years?
6.		4		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		2	2	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	2			Attendant busy lamp field
c	3			Attendant conference
d	2			Attendant direct station selection
e	1			Attendant intercept
f	1			Attendant recall
g	2			Automatic dialers
h	2			Automatic identification of outward dialing
i	2			Automatic route selection
j	3			Call forwarding
k	2			Call hold
l	2			Call waiting indication
m	1			Customer administration center
n	2			Data privacy
o	4			Direct-in-dialing
p	3			Hunting
q	2			Individual call transfer
r	3			Intercom
s	3			Power failure capability
t	3			Pushbutton dialing
u	2			Traffic measurement
v	2			WATS timing
w	3			Queueing
x	2			Intercept
y	3			Out-of-hours arrangements
z	2			Speaker phones
aa	1			Message centers
bb	3			Add-on-conference
cc	3			Speed dialing
dd	1			System test facilities
ee	2			Camp-on
ff	1			Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii	1			System feature cancellation
jj	2			Training program
kk	1			Installation program
ll	2			Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
0	1

Mail Survey Comments

BOULDER: During Legislature can't get hot lines.

Different ring sounds for phones in offices off of main hallway would be helpful: difficult to identify which phone is ringing out of the office.

TABLE 16c SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION INSTITUTIONS (DEER LODGE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 13

Number of Questionnaires Returned _____ (Helena agencies)

1 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		1		Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b	1			System busy
c	1			System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1			Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j	1			Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	1			Hunting
q	1			Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	1			Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 16d SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION INSTITUTIONS (GALEN STATE HOSPITAL)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 10

Number of Questionnaires Returned _____ (Helena agencies)

4 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	2	1	1	Average number times per day you use State of Montana telephones
2.	3	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2			System out of order
b		1	1	System busy
c	1	1		System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f				Inaccurate or misleading information from vendors
g				Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	3			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	3	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		4		Has your telephone system grown in last 5 years?
6.	2	2		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			4	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f	1			Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk	1			Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

Mail Survey Comments

GALEN: The Galen State Hospital phone system is under study to be merged with Warm Springs State Hospital as one central switchboard for both agencies (part of GSH and WSSH consolidation).

TABLE 16e SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION INSTITUTIONS (WARM SPRINGS STATE HOSPITAL)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 11

Number of Questionnaires Returned _____ (Helena agencies)

2 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.			2	Average number times per day you use State of Montana telephones
2.	1	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2			System out of order
b	1	1		System busy
c	2			System interference
d	2			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1			Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	2			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		1		Has your telephone system grown in last 5 years?
6.		2		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			2	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e	1			Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j	1			Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q	1			Individual call transfer
r				Intercom
s	1			Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	2

TABLE 17 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION JUSTICE

1979-80 Telephone Expenditures $79,907.98

Interview Respondent John Mathews

Job Title Assistant Administrator, Central Services Division

Number of Questionnaires Mailed 16

Number of Questionnaires Returned 8 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	2	2	4	Average number times per day you use State of Montana telephones
2.	4	4		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	7	*		System out of order
b	4	4	*	System busy
c	8*			System interference
d	5*		1	Poor turnaround times for labor orders
e	3*		1	Incorrect billings
f	4	*	1	Inaccurate or misleading information from vendors
g	2	1	1*	Escalating costs
h	4*		1	Inadequate possibilities for expanding system
	Yes	No		
4a	4	1*		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	6*	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	6	1		Has your telephone system grown in last 5 years?
6.	2	4		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	1	2	4*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	4			Attendant busy lamp field
c	2			Attendant conference
d	2			Attendant direct station selection
e	1			Attendant intercept
f	1			Attendant recall
g	2	*		Automatic dialers
h	1			Automatic identification of outward dialing
i	4			Automatic route selection
j	3			Call forwarding
k	4*	*		Call hold
l	3			Call waiting indication
m				Customer administration center
n	3			Data privacy
o	2			Direct-in-dialing
p	3			Hunting
q	3	*		Individual call transfer
r	4	*		Intercom
s	2		*	Power failure capability
t	2	*		Pushbutton dialing
u				Traffic measurement
v	3	*		WATS timing
w	1	*		Queueing
x	1			Intercept
y	2			Out-of-hours arrangements
z	1			Speaker phones
aa	2			Message centers
bb	2			Add-on-conference
cc	3			Speed dialing
dd	1			System test facilities
ee	2			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	2			Training program
kk				Installation program
ll				Interconnection plans

aaa			Attendant centralized service
bbb			Attendant console
ccc		*	Interface for long-distance calling
ddd			Call park
eee			Call pickup
fff			Call transfer
ggg	*		Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm		*	Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

	No
1	2

Mail Survey Comments

I need to be able to answer other com-lines. If funding were available, we could update our system.

Personal Interview Comments

Telephone System Manager(s) Central Services Division

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Montana Highway Patrol, Deer Lodge State Prison and Crime Lab, Missoula have installed new systems within the past 2 years.

Agencies and telephones are more consolidated now that they are all in the Hart Building.

What, if any, changes in the department do you expect?

Nine employees from DCA will be added to the department.

Central Services and the Attorney General will move to the new building in 1982.

Additional comments:

The capability to expand the telephone system within the Hart Building is inadequate.

Telephone access to and from the department and Butte, Missoula, Deer Lodge, and Bozeman is inadequate between 3-5 p.m. weekdays.

The existing system is functional and generally adequate.

TABLE 18 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LABOR AND INDUSTRY: TOTAL

1979-80 Telephone Expenditures $42,349.47

Interview Respondent William G. Groepper

Job Title Assistant Deputy Administrator, Employment Services Bureau

Number of Questionnaires Mailed 28

Number of Questionnaires Returned 10 (Helena agencies)

2 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.		4	8	Average number times per day you use State of Montana telephones
2.	1	10	1	Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	10*	1	1	System out of order
b	2	8	2*	System busy
c	6*	4	2	System interference
d	8*	1		Poor turnaround times for labor orders
e	10*			Incorrect billings
f	9*			Inaccurate or misleading information from vendors
g	4	1	1*	Escalating costs
h	7	1	*	Inadequate possibilities for expanding system

	Yes	No	
4a	7	3*	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	9*	1	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	8	2	Has your telephone system grown in last 5 years?
6.	5	5	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.		7	3*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	1			Area code restriction
b	3			Attendant busy lamp field
c				Attendant conference
d	1			Attendant direct station selection
e				Attendant intercept
f	1			Attendant recall
g	5			Automatic dialers
h	1			Automatic identification of outward dialing
i	1			Automatic route selection
j	1			Call forwarding
k	2	*		Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o	1			Direct-in-dialing
p	3			Hunting
q	2	*		Individual call transfer
r	1	*		Intercom
s				Power failure capability
t	2	*		Pushbutton dialing
u	1			Traffic measurement
v		*		WATS timing
w	3			Queueing
x	1			Intercept
y	1			Out-of-hours arrangements
z	2			Speaker phones
aa	1			Message centers
bb	2			Add-on-conference
cc	4			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii				System feature cancellation
jj	1			Training program
kk	1			Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
3	3

TABLE 18a SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LABOR AND INDUSTRY (HELENA)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 28

Number of Questionnaires Returned 10 (Helena agencies)

2 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		3	7	Average number times per day you use State of Montana telephones
2.		9	1	Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	8	1	1	System out of order
b	2	6	2	System busy
c	5	3	2	System interference
d	7			Poor turnaround times for labor orders
e	8			Incorrect billings
f	7			Inaccurate or misleading information from vendors
g	3	1	1	Escalating costs
h	5	1		Inadequate possibilities for expanding system
	Yes	No		
4a	6	2		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	7	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	6	2		Has your telephone system grown in last 5 years?
6.	4	4		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		5	3	How long do you feel you can continue functioning efficiently with the system you currently possess.

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	2			Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f	1			Attendant recall
g	3			Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j	1			Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	2			Hunting
q	1			Individual call transfer
r				Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w	2			Queueing
x				Intercept
y	1			Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	3			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
3	3

Mail Survey Comments

System adequate.

In office such as Billings East, the PBX system is old and slow.

Offices system relatively new, more efficient than some of the offices' systems. Pushbutton dialing would provide faster calls which are important in serving a high volume of public traffic looking for jobs.

Ability to relocate desks is a necessity because of changing priorities. The com key system's charge for moving phones is prohibitive to accomplish movement for needed relocation of desks within building.

Horizon Telephone System works great!

Getting the party connected to the correct person in a timely manner. Distinguishing if they're on the phone or if it's off the hook.

Need more lines.

My job calls for extensive use of phone for calls throughout the state and out of state. The volume and nature of the work does not allow time to wait to get into the WATS system and many times it is busy. Therefore it requires direct dialing on commercial lines. Our in-house system appears to be fairly modern, but it still gets overloaded.

Need capability to tape conversations, enable to take statements over phone.

Personal Interview Comments

Telephone System Manager(s) Each division manages its own telephone system.

Has the trend in management problems become more serious over time?

The two new Horizon systems have lessened the number of lines and the number of problems.

Has your telephone system grown in the past five years?

Two Horizon systems have been installed servicing the Employment Services Bureau and the Unemployment Insurance Bureau.

What, if any, changes in the department do you expect?

None anticipated.

Additional comments:

Management of the telephone system would be more efficient if the Public Service Commission would supply rate approval projections.

An efficient state-owned interdepartmental intercom system could reduce the number of lines leased from Mountain Bell, and would speed up communications.

The possible leasing of existing data transmission lines for voice transmission should be explored.

A telephone resource person or publication needs to be made available to agencies, supplying up-to-date information on state-of-the-art technologies and cost effectiveness of equipment features.

TABLE 18b SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LABOR AND INDUSTRY (GREAT FALLS)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 28

Number of Questionnaires Returned 10 (Helena agencies)

1 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.			1	Average number times per day you use State of Montana telephones
2.		1		Average number out-of-town calls you make per day

	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b		1		System busy
c	1			System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1			Escalating costs
h	1			Inadequate possibilities for expanding system

	Yes	No	
4a		1	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1		Has your telephone system grown in last 5 years?
6.	1		Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.		1		How long do you feel you can continue functioning efficiently with the system you currently possess.

	Mail Survey	Necessary	Very Desirable	
8a	1			Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d	1			Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h	1			Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	1			Hunting
q	1			Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w	1			Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	1			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 18c SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LABOR AND INDUSTRY (MISSOULA)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 28

Number of Questionnaires Returned 10 (Helena agencies)

1 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		1		Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b		1		System busy
c		1		System interference
d		1		Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g				Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1		How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o	1			Direct-in-dialing
p				Hunting
q				Individual call transfer
r	1			Intercom
s				Power failure capability
t	1			Pushbutton dialing
u	1			Traffic measurement
v				WATS timing
w				Queueing
x	1			Intercept
y				Out-of-hours arrangements
z	1			Speaker phones
aa	1			Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii				System feature cancellation
jj				Training program
kk	1			Installation program
ll	1			Interconnection plans

TABLE 19 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LANDS

1979-80 Telephone Expenditures $22,358.69

Interview Respondent Kelly Blake

Job Title Administrative Officer

Number of Questionnaires Mailed 0

Number of Questionnaires Returned _____ (Helena agencies)

_____ (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.				Average number times per day you use State of Montana telephones
2.				Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	*			System out of order
b	*			System busy
c	*			System interference
d	*			Poor turnaround times for labor orders
e	*			Incorrect billings
f	*			Inaccurate or misleading information from vendors
g			*	Escalating costs
h	*			Inadequate possibilities for expanding system
	Yes	No		
4a		*		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b		*		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.				Has your telephone system grown in last 5 years?
6.				Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	*			How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j		*		Call forwarding
k		*		Call hold
l		*		Call waiting indication
m		*		Customer administration center
n		*		Data privacy
o		*		Direct-in-dialing
p		*		Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w		*		Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc		*		Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Personal Interview Comments

Telephone System Manager(s) Centralized Services

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Two in-lines, and approximately three out-lines have been installed. The growth reflects the addition of employees to the department.

What, if any, changes in the department do you expect?

01 July 81 Forestry Division will transfer from DNRC to Dept. Lands. Most of the 118 employees are located in Missoula, and the telephony changes will be centered there.

Additional comments:

A "busy study" was completed recently and results indicate that the existing number of telephone lines is marginally acceptable.

The department does receive complaints about the in-lines being frequently busy.

TABLE 20 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LEGISLATIVE BRANCH

1979-80 Telephone Expenditures $29,145.92

Number of Questionnaires Mailed 4

Number of Questionnaires Returned 1 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		1		Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b		1		System busy
c		1		System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g		1		Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r	1			Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 21 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LIVESTOCK: TOTAL

1979-80 Telephone Expenditures $42,576.22

Interview Respondent Diana Hultman

Job Title Administrative Secretary, Animal Health Division

Number of Questionnaires Mailed 5

Number of Questionnaires Returned 2 (Helena agencies)

3 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	2	2	1	Average number times per day you use State of Montana telephones
2.	4	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2*	1		System out of order
b	1*	3		System busy
c	2*	2		System interference
d	1*			Poor turnaround times for labor orders
e	3*			Incorrect billings
f	1*			Inaccurate or misleading information from vendors
g	1	1	*	Escalating costs
h	1*			Inadequate possibilities for expanding system
	Yes	No		
4a	3	1*		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	3*			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	4	1		Has your telephone system grown in last 5 years?
6.	1	2		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1	2*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c			*	Attendant conference
d				Attendant direct station selection
e			*	Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j		*		Call forwarding
k		*		Call hold
l		*		Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q		*		Individual call transfer
r		*		Intercom
s		*		Power failure capability
t	1	*		Pushbutton dialing
u				Traffic measurement
v		*		WATS timing
w	1	*		Queueing
x				Intercept
y				Out-of-hours arrangements
z	1		*	Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd		*		System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg		*		Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

aaa	*		Attendant centralized service
bbb			Attendant console
ccc	*		Interface for long-distance calling
ddd	*		Call park
eee	*		Call pickup
fff	*		Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii	*		Line lockout with warning
jjj		*	Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm	*		Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

Personal Interview Comments

Telephone System Manager(s) Central Services Division

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Added 5-6 telephone sets with increased employees.

What, if any, changes in the department do you expect?

Subject to approval: 01 Aug 81 several state and federal offices will move to adjacent offices. Some telephones will also be relocated.

Additional comments:

151 WATS access in inadequate, especially on Mondays and Fridays.

Existing system is adequate with the possible addition of one line.

TABLE 21a SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LIVESTOCK (HELENA)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 5

Number of Questionnaires Returned 2 (Helena agencies)

_____ (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	2			Average number times per day you use State of Montana telephones
2.	2			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a				System out of order
b		1		System busy
c			1	System interference
d				Poor turnaround times for labor orders
e				Incorrect billings
f				Inaccurate or misleading information from vendors
g				Escalating costs
h				Inadequate possibilities for expanding system

	Yes	No	
4a	1		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1	1	Has your telephone system grown in last 5 years?
6.		1	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w	1			Queueing
x				Intercept
y				Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 21b SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION LIVESTOCK (BUTTE)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 5

Number of Questionnaires Returned _____ (Helena agencies)

3 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		2	1	Average number times per day you use State of Montana telephones
2.	2	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2	1		System out of order
b	1	2		System busy
c	2		1	System interference
d	1			Poor turnaround times for labor orders
e	3			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1	1		Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	2	1		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	3			Has your telephone system grown in last 5 years?
6.	1	1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.		1	1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

Mail Survey Comments

BUTTE: Phone is noisy when in use (static). At some stations, a busy signal occurs when the party picks up the phone on the other end.

WATS line is rather noisy; also it gives a busy signal about 50-60% of the time, even before number has been completely dialed. Also, from our WATS line we are unable to call any station in the Boulder area.

I am satisfied with current telephone system.

TABLE 22 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION MILITARY AFFAIRS

1979-80 Telephone Expenditures $59,881.75

Interview Respondent Kenneth E. Cottrill

Job Title Administrator, Centralized Services, Army National Guard Headquarters

Number of Questionnaires Mailed 1

Number of Questionnaires Returned 1 (Helena agencies)

_____ (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.			1	Average number times per day you use State of Montana telephones
2.		1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1*			System out of order
b	*	1		System busy
c	1*			System interference
d	1*			Poor turnaround times for labor orders
e	1*			Incorrect billings
f	1*			Inaccurate or misleading information from vendors
g			1*	Escalating costs
h	1*			Inadequate possibilities for expanding system

	Yes	No	
4a	1	*	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1*		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1		Has your telephone system grown in last 5 years?
6.	1		Do [illegible] feel that your organization needs a new, or [illegible]raded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.			*	How [illegible]ng do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h			*	Automatic identification of outward dialing
i				Automatic route selection
j	1			Call forwarding
k		*		Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q	1	*		Individual call transfer
r	1	*		Intercom
s	1	*		Power failure capability
t		*		Pushbutton dialing
u				Traffic measurement
v	1	*		WATS timing
w				Queueing
x				Intercept
y	1			Out-of-hours arrangements
z				Speaker phones
aa	1			Message centers
bb				Add-on-conference
cc				Speed dialing
dd		*		System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii		*		System feature cancellation
jj				Training program
kk		*		Installation program
ll				Interconnection plans
aaa				Attendant centralized service
bbb				Attendant console
ccc				Interface for long-distance calling
ddd				Call park
eee				Call pickup
fff				Call transfer
ggg				Emergency access to attendant
hhh				Executive override
iii				Line lockout with warning
jjj				Loudspeaker
kkk				Miscellaneous trunk restrictions
lll				Radio paging
mmm				Recorded telephone dictation access
nnn				Timed recall on outgoing calls
ooo		*		Station restriction features
ppp				Data communication access
qqq				Data restriction
rrr				Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	

Personal Interview Comments

Telephone System Manager(s) Administrator of Centralized Services

Has the trend in management problems become more serious over time?

Costs for the system have increased $40,000 since 1977, without an appreciable increase in equipment.

Has your telephone system grown in the past five years?

Added a central console, and 5-6 lines. Sets have increased with employee increases.

What, if any, changes in the department do you expect?

Minor internal reorganizational changes are expected.

Investigating possibility of establishing 1-3 central operators to reduce the number of necessary lines.

Additional comments:

The military has units in every Montana county. Phone service to some counties is inadequate. The department is examining the possibility of using radio communications with boosters in place of telephoning.

The military requires touch-tone dialing for their Autovon Service (world-wide military communications).

Access to 151 WATS is never satisfactory.

Short-term hookups, for military or disaster units, are rarely adequate nor able to be installed quickly.

TABLE 23 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION MONTANA BUREAU OF MINES AND GEOLOGY

1979-80 Telephone Expenditures (not available)

Number of Questionnaires Mailed 1

Number of Questionnaires Returned _____ (Helena agencies)

1 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		1		Average number times per day you use State of Montana telephones
2.	1			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	1			System out of order
b	1			System busy
c	1			System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1			Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	1			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.		1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m	1			Customer administration center
n				Data privacy
o				Direct-in-dialing
p	1			Hunting
q				Individual call transfer
r				Intercom
s	1			Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x	1			Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Mail Survey Comments

Most of the Dimension system's features allow us most of the above capabilities.

TABLE 24 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION NATURAL RESOURCES AND CONSERVATION

1979-80 Telephone Expenditures $72,069.35

Interview Respondent Jerry Smith

Job Title Assistant Administrator, Centralized Services Division

Number of Questionnaires Mailed 20

Number of Questionnaires Returned 6 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.		2	4	Average number times per day you use State of Montana telephones
2.		6		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	4	1*		System out of order
b	1	4	1*	System busy
c	5	1	*	System interference
d	3	1*		Poor turnaround times for labor orders
e	3*			Incorrect billings
f	3*			Inaccurate or misleading information from vendors
g	1		2*	Escalating costs
h	2		1*	Inadequate possibilities for expanding system
	Yes	No		
4a	5	1*		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	4	1*		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	4			Has your telephone system grown in last 5 years?
6.	1	5		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	1*	3	2	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h			*	Automatic identification of outward dialing
i				Automatic route selection
j	1			Call forwarding
k	1	*		Call hold
l	1	*		Call waiting indication
m	1			Customer administration center
n		*		Data privacy
o	1			Direct-in-dialing
p	2			Hunting
q	2	*		Individual call transfer
r	1	*		Intercom
s				Power failure capability
t	3	*		Pushbutton dialing
u				Traffic measurement
v		*		WATS timing
w	2	*		Queueing
x			*	Intercept
y	1			Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	2			Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee	2			Camp-on
ff				Line lockout/tone denial
gg		*		Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

aaa			Attendant centralized service
bbb			Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee			Call pickup
fff			Call transfer
ggg	*		Emergency access to attendant
hhh		*	Executive override
iii			Line lockout with warning
jjj	*		Loudspeaker
kkk			Miscellaneous trunk restrictions
lll		*	Radio paging
mmm		*	Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp	*		Data communication access
qqq	*		Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	3

Personal Interview Comments

Telephone System Manager(s) Centralized Services Division

Has the trend in management problems become more serious over time?

Increasing costs are significant. The frequency of lines being busy is also a growing problem.

Has your telephone system grown in the past five years?

The department has added 24-40% more employees, with corresponding telephone increases.

The Facility Siting Division equipment is altered constantly as projects change.

What, if any, changes in the department do you expect?

FY 81-82 several divisions will move locations. 01 July 81 Forestry Division is moving from DNRC to Dept. State Lands. Currently examining possibility of adding 8-10 ten-button sets, plus several more lines.

"Busy study" showed the lines busy 40% of the time.

4-5 years the entire department will move into a new building. Currently they occupy 4 different buildings and intra-agency communications are inadequate.

Additional comments:

Interference on lines is a problem. Engineering Bureau of Water Resources Division, and Miles City WATS lines are the most troublesome.

The existing telephone system has been inadequate for 3-4 years already. Immediate changes are necessary.

Mail Survey Comments

For my needs, the present system is adequate. It seems to me that the state phone system should be efficient (which for the most part it is) but I don't think taxpayers should be asked to pay for additional fancy, nice, but unnecessary equipment.

I believe our telephone system has kept up with the need and is fairly adequate at the present time.

Maybe I'm more inexperienced or less knowledgeable regarding the telephone than most, but I really don't know what you're talking about when you use terms like "Data Privacy," "Attendant Busy Lamp Field." For the current size of our office, we seem to have a fairly efficient system. Of course it's always nice to improve with quicker and more efficient methods.

"Com-line" system confusing--at least 3 different sets of lines; creates different call numbers to use depending on line. Also, not nearly enough outside lines.

TABLE 25 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION PROFESSIONAL AND OCCUPATIONAL LICENSING

1979-80 Telephone Expenditures $16,697.25

Interview Respondent Mary Lou Garrett

Job Title Administrative Officer, Central Services Division

Number of Questionnaires Mailed 0

Number of Questionnaires Returned _____ (Helena agencies)

_____ (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.				Average number times per day you use State of Montana telephones
2.				Average number out-of-town calls you make per day

	1	2	3	Problems encountered when using state telephone system
3a				System out of order
b				System busy
c				System interference
d				Poor turnaround times for labor orders
e				Incorrect billings
f				Inaccurate or misleading information from vendors
g				Escalating costs
h				Inadequate possibilities for expanding system

	Yes	No		
4a	*			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	*			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.				Has your telephone system grown in last 5 years?
6.				Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.	*			How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

aaa			Attendant centralized service
bbb			Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee	*		Call pickup
fff	*		Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c		*		Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j		*		Call forwarding
k		*		Call hold
l		*		Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q		*		Individual call transfer
r		*		Intercom
s				Power failure capability
t		*		Pushbutton dialing
u				Traffic measurement
v		*		WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

Personal Interview Comments

Telephone System Manager(s) Central Services

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Added 1-2 telephone sets.

What, if any, changes in the department do you expect?

01 July 81 Moving location of agency to DCA building.

Additional comment

Existing system is totally inadequate. More lines were recommended 2-3 years ago but the department has not had the funds to install them.

They recommend using * button on telephone set plus code number for easier identification of long distance calls by agency.

TABLE 26 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION OFFICE OF PUBLIC INSTRUCTION

1979-80 Telephone Expenditures $3,044.93

Interview Respondent Marilyn Miller

Job Title Administrative Assistant

Number of Questionnaires Mailed 8

Number of Questionnaires Returned 5 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	1	3	1	Average number times per day you use State of Montana telephones
2.	2	3		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	4*			System out of order
b	*	3	1	System busy
c	2	1	1*	System interference
d	2*			Poor turnaround times for labor orders
e	1*			Incorrect billings
f	1*			Inaccurate or misleading information from vendors
g	1		2*	Escalating costs
h	2*			Inadequate possibilities for expanding system

	Yes	No	
4a	3	1*	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	4*		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1	1	Has your telephone system grown in last 5 years?
6.	1	3	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.	1	1	2*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c	1	*		Attendant conference
d	1			Attendant direct station selection
e				Attendant intercept
f	1		*	Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i	4			Automatic route selection
j	1	*		Call forwarding
k		*		Call hold
l	2			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q	2	*		Individual call transfer
r	1	*		Intercom
s	1			Power failure capability
t	2	*		Pushbutton dialing
u				Traffic measurement
v		*		WATS timing
w	1	*		Queueing
x				Intercept
y	1			Out-of-hours arrangements
z	1	*		Speaker phones
aa	1		*	Message centers
bb	1			Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee				Camp-on
ff	1			Line lockout/tone denial
gg	1	*		Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii				System feature cancellation
jj		*		Training program
kk		*		Installation program
ll		*		Interconnection plans

aaa	*		Attendant centralized service
bbb			Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee	*		Call pickup
fff	*		Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii		*	Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	1

Personal Interview Comments

Telephone System Manager(s) Staff Services Manager

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Added extra lines with increased employees.

What, if any, changes in the department do you expect?

Possible transfers of personnel within the existing buildings.

Additional comments:

Communications Division personnel are currently examining the system.

Immediate changes are necessary; the existing system is inadequate.

Budget planning is inefficient because billings are 1-2 months behind.

Radio broadcasting transmissions are interfering with telephone communications in the 11th Avenue building.

Mail Survey Comments

Line noise: usually acceptable, but is worse on 151 calls. Busy: in-state calls OK, but out-of-state calls often busy. System functions adequately. Addition of the "fancy" features listed under #8 would be handy, but not necessary. If those features can be implemented at little more than current rates, do it! But if cost is much more, it probably isn't worth it. Question: How does this affect data lines?

TABLE 27 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION REVENUE (TOTAL)

1979-80 Telephone Expenditures $103,506.57

Interview Respondent John Clark

Job Title Deputy Director

Number of Questionnaires Mailed 37

Number of Questionnaires Returned 6 (Helena agencies)

11 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.	4	5	8	Average number times per day you use State of Montana telephones
2.	11	5		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone syste
3a	14*	1	1	System out of order
b	10	3*	3	System busy
c	13*	2	1	System interference
d	15*			Poor turnaround times for labor orders
e	13*	1		Incorrect billings
f	14*			Inaccurate or misleading information from vendors
g	10	3	*	Escalating costs
h	5*		1	Inadequate possibilities for expanding system

	Yes	No	
4a	3*	6	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	9	3*	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	5	7	Has your telephone system grown in last 5 years?
6.	3	9	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.	2	2	8	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	1	*		Area code restriction
b	1			Attendant busy lamp field
c	1			Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h	1			Automatic identification of outward dialing
i	3			Automatic route selection
j				Call forwarding
k	2			Call hold
l	3			Call waiting indication
m				Customer administration center
n	1			Data privacy
o	1			Direct-in-dialing
p	4			Hunting
q	1			Individual call transfer
r	2	*		Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	2			Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk	1			Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	1

TABLE 27a SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION REVENUE (HELENA)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 37

Number of Questionnaires Returned 6 (Helena agencies)

11 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		2	4	Average number times per day you use State of Montana telephones
2.	3	3		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	4*		1	System out of order
b	1	2*	2	System busy
c	3*			System interference
d	4*			Poor turnaround times for labor orders
e	2*	1		Incorrect billings
f	3*			Inaccurate or misleading information from vendors
g		2	*	Escalating costs
h	1*		1	Inadequate possibilities for expanding system

	Yes	No	
4a	2*	3	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	4	1*	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	2	2	Has your telephone system grown in last 5 years?
6.	2	2	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.	1	*	2	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	1	*		Area code restriction
b	1			Attendant busy lamp field
c	1			Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i	1			Automatic route selection
j				Call forwarding
k				Call hold
l	1			Call waiting indication
m				Customer administration center
n	1			Data privacy
o	1			Direct-in-dialing
p	1			Hunting
q	1			Individual call transfer
r	2	*		Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk	1			Installation program
ll				Interconnection plans

aaa			Attendant centralized service
bbb			Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee			Call pickup
fff			Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj	*		Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	1

Personal Interview Comments

Telephone System Manager(s) Audit and Accounting Division and individual division administrators

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Added some WATS access to Child Support Enforcement outlying offices.

Property Tax division added a paging system.

What, if any, changes in the department do you expect?

Expect to phase out data transmission access line from Bozeman and will use Dept. of Administration access.

The Liquor Division is currently soliciting proposals for a data transmission system which will link the 140 retail stores to a centralized inventory control and management system.

Additional comments:

The income tax toll-free line is busied out too much. Additional lines and personnel are needed on a seasonal basis.

Motor Fuels Tax Division and Miscellaneous Tax Division need more lines.

Income Tax Division has requested a paging system.

Most systems are adequate, with exception of the above.

Mail Survey Comments

Com-key system installed three years ago is very adequate at this time. Works very well for this dept.

The WATS system needs improvement, but the Legal Division has a sufficient physical system.

I could tell you in a layman's terms what I'm looking for in a telephone system, but I don't think I've conveyed these needs in this questionnaire.

Some of the telephones within the division are not connected with the intercom system.

TABLE 27b SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION REVENUE (FIELD ASSESSORS)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 37

Number of Questionnaires Returned 6 (Helena agencies)

8 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1	3	4	Average number times per day you use State of Montana telephones
2.	5	2	1	Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone syste.
3a	7	1		System out of order
b	7		1	System busy
c	7	1		System interference
d	8			Poor turnaround times for labor orders
e	8			Incorrect billings
f	8			Inaccurate or misleading information from vendors
g	7	1		Escalating costs
h	1			Inadequate possibilities for expanding system

	Yes	No	
4a	1	3	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	4	2	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	3	3	Has your telephone system grown in last 5 years?
6.	1	5	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yr	yrs	
7.	1	2	5	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h	1			Automatic identification of outward dialing
i	2			Automatic route selection
j				Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	3			Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
				Intercept
				Out-of-hours arrangements
				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Mail Survey Comments

BUTTE: Telephone system adequate.

GLASGOW: Need hold button.

BIG HORN: System new and adequate.

TABLE 27c SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION REVENUE (LIQUOR RETAIL STORES)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 37

Number of Questionnaires Returned 6 (Helena agencies)

3 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	3			Average number times per day you use State of Montana telephones
2.	3			Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	3			System out of order
b	2	1		System busy
c	3			System interference
d	3			Poor turnaround times for labor orders
e	3			Incorrect billings
f	3			Inaccurate or misleading information from vendors
g	3			Escalating costs
h	3			Inadequate possibilities for expanding system

	Yes	No	
4a			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.		2	Has your telephone system grown in last 5 years?
6.		2	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.			1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	1			Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

TABLE 28 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION SECRETARY OF STATE

1979-80 Telephone Expenditures $6,891.12

Number of Questionnaires Mailed 1

Number of Questionnaires Returned 1 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.			1	Average number times per day you use State of Montana telephones
2.		1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone syster
3a	1			System out of order
b	1			System busy
c	1			System interference
d		1		Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g		1		Escalating costs
h			1	Inadequate possibilities for expanding system
	Yes	No		
4a		1		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	1			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.	1			Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	1			How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j	1			Call forwarding
k	1			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p	1			Hunting
q	1			Individual call transfer
r	1			Intercom
s				Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w	1			Queueing
x				Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb				Add-on-conference
cc				Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	

TABLE 29 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION SOCIAL AND REHABILITATION SERVICES

1979-80 Telephone Expenditures $190,929.24

Interview Respondent Joseph E. Winfield

Job Title Chief, General Services Bureau

Number of Questionnaires Mailed 42

Number of Questionnaires Returned 12 (Helena agencies)

7 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.		7	12	Average number times per day you use State of Montana telephones
2.	9	10		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	13*	1	2	System out of order
b	7*	6	5	System busy
c	12*	2	2	System interference
d	7*		2	Poor turnaround times for labor orders
e	6	*		Incorrect billings
f	7*			Inaccurate or misleading information from vendors
g	10	3	2*	Escalating costs
h	6*	1		Inadequate possibilities for expanding system
	Yes	No		
4a	11*	9		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	16*	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	14	4		Has your telephone system grown in last 5 years?
6.	3	15		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	5	5	9*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c	1			Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h	2			Automatic identification of outward dialing
i	5			Automatic route selection
j	3			Call forwarding
k	4			Call hold
l	1			Call waiting indication
m	1			Customer administration center
n				Data privacy
o	1			Direct-in-dialing
p	4			Hunting
q	3			Individual call transfer
r	1			Intercom
s	1			Power failure capability
t	2			Pushbutton dialing
u				Traffic measurement
v	2			WATS timing
w	2			Queueing
x	2			Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	2			Add-on-conference
cc	1			Speed dialing
dd				System test facilities
ee	2			Camp-on
ff				Line lockout/tone denial
gg	3			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	5

TABLE 29a SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION SRS (HELENA)

1979-80 Telephone Expenditures _____

Number of Questionnaires Mailed 42

Number of Questionnaires Returned 12 (Helena agencies)

7 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		5	7	Average number times per day you use State of Montana telephones
2.	4	8		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone syste
3a	9	1	1	System out of order
b	4	4	4	System busy
c	9	1	1	System interference
d	6		1	Poor turnaround times for labor orders
e	5			Incorrect billings
f	6			Inaccurate or misleading information from vendors
g	9	2	2	Escalating costs
h	5	1		Inadequate possibilities for expanding system
	Yes	No		
4a	8	7		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	11			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	8	3		Has your telephone system grown in last 5 years?
6.	2	10		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	3	5	4	How long do you feel you can continue functioning efficiently with the system you currently possess.

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c	1			Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h	2			Automatic identification of outward dialing
i	3			Automatic route selection
j	3			Call forwarding
k	2			Call hold
l	4			Call waiting indication
m	1			Customer administration center
n				Data privacy
o				Direct-in-dialing
p	4			Hunting
q	3			Individual call transfer
r	1			Intercom
s	1			Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v	2			WATS timing
w	2			Queueing
x	1			Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	1			Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj	1			Training program
kk				Installation program
ll				Interconnection plans

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	5

Mail Survey Comments

I did not check any of these, because it sounds like the dimension system through Mountain Bell and this system does not work. I have worked with the dimension system and found it to be a very inadequate system.

I am generally satisfied. WATS lines are much better than they used to be. Sorry I don't understand most of your questions. Most "gadgets" are not worth their cost.

We have quite a few of the above features (Question 8) and are quite happy with everything.

Personal Interview Comments

Telephone System Manager(s) Centralized Services Division

Has the trend in management problems become more serious over time?

Not significantly. The problems are static.

Has your telephone system grown in the past five years?

Added lines and sets as employees increased.

What, if any, changes in the department do you expect?

Installed several toll-free lines to Medical Assistance Program and Aging Services Bureau.

All district offices now have conference capabilities.

Four speaker phone systems have been installed.

Losing 60-70 employees 01 July 81 and gaining several from DCA.

Additional comments:

The existing telephone system is as efficient as is needed.

TABLE 29b SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION SRS (FIELD) (Field office respondents were grouped together as their responses showed few discrepancies.

1979-80 Telephone Expenditures (Great Falls, Butte, Missoula, and Fergus Co.

Number of Questionnaires Mailed 42

Number of Questionnaires Returned 12 (Helena agencies)

7 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.		2	4	Average number times per day you use State of Montana telephones
2.	5	2		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone syste
3a	4		1	System out of order
b	3	2	1	System busy
c	3	1	1	System interference
d	1		1	Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1	1		Escalating costs
h	1			Inadequate possibilities for expanding system

	Yes	No	
4a	3	2	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	5	1	Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	6	1	Has your telephone system grown in last 5 years?
6.	1	5	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.	2		5	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i	2			Automatic route selection
j				Call forwarding
k	2			Call hold
l	1			Call waiting indication
m				Customer administration center
n				Data privacy
o	1			Direct-in-dialing
p				Hunting
q				Individual call transfer
r				Intercom
s				Power failure capability
t	1			Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x	1			Intercept
y				Out-of-hours arrangements
z				Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc				Speed dialing
dd				System test facilities
ee	1			Camp-on
ff				Line lockout/tone denial
gg	2			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

Mail Survey Comments

Great Falls: It's almost impossible to call any station with a 135 or a 128 access code. Much time is wasted trying. This has been reported through the state operator, but the problem hasn't been corrected.

TABLE 30 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION MONTANA UNIVERSITY SYSTEM - COMM. HIGHER EDUCATION

1979-80 Telephone Expenditures $16,297.53

Interview Respondent Paul Dunham

Job Title Director, Planning and Research, Office of Comm. of Higher Ed.

Number of Questionnaires Mailed 1

Number of Questionnaires Returned 0 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

(*) represents response obtained from personal interview

	0-2	3-10	11+	
1.				Average number times per day you use State of Montana telephones
2.				Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	*			System out of order
b		*		System busy
c	*			System interference
d	*			Poor turnaround times for labor orders
e	*			Incorrect billings
f	*			Inaccurate or misleading information from vendors
g			*	Escalating costs
h	*			Inadequate possibilities for expanding system
	Yes	No		
4a	*			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b		*		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.				Has your telephone system grown in last 5 years?
6.				Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.			*	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b				Attendant busy lamp field
c			*	Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g				Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k		*		Call hold
l				Call waiting indication
m			*	Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q		*		Individual call transfer
r		*		Intercom
s				Power failure capability
t		*		Pushbutton dialing
u				Traffic measurement
v		*		WATS timing
w			*	Queueing
x				Intercept
y				Out-of-hours arrangements
z			*	Speaker phones
aa				Message centers
bb				Add-on-conference
cc			*	Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg			*	Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

aaa	*		Attendant centralized service
bbb	*		Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee		*	Call pickup
fff		*	Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo		*	Station restriction features
ppp	*		Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No

Personal Interview Comments

Telephone System Manager(s) Deputy Commissioner for Financial Affairs

Has the trend in management problems become more serious over time?

Yes. The MSTS teleconferencing is too limited, the quality of sound is poor, and the number and location of tie-ins are inadequate.

Has your telephone system grown in the past five years?

The telephone system is larger with increased personnel and after the move from 11th Avenue to current location.

What, if any, changes in the department do you expect?

Expecting to add a few staff members from a federal project.

Additional comments:

Ability to reprogram telephone changes within the offices would save money and is desirable.

WATS access is adequate except when legislature is in session. Great Falls, Missoula and Bozeman are consistently difficult to reach.

Office uses Eastern Montana College conferencing capabilities. This features unlimited conferences, good sound quality, and distribution of payments.

Communications Division is currently examining the telephone systems of WMC, MT Tech, and NMC.

TABLE 31 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION MONTANA STATE UNIVERSITY

1979-80 Telephone Expenditures $165,809.17

Number of Questionnaires Mailed 45

Number of Questionnaires Returned _____ (Helena agencies)

14 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	5	3	6	Average number times per day you use State of Montana telephones
2.	8	5		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	11			System out of order
b		8	6	System busy
c	10	1		System interference
d	7	1		Poor turnaround times for labor orders
e	6			Incorrect billings
f	6			Inaccurate or misleading information from vendors
g	2	4		Escalating costs
h	5	1		Inadequate possibilities for expanding system
	Yes	No		
4a	7	5		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	11	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	11	2		Has your telephone system grown in last 5 years?
6.	2	9		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	1	4	5	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	2			Attendant busy lamp field
c	3			Attendant conference
d				Attendant direct station selection
e	1			Attendant intercept
f				Attendant recall
g	3			Automatic dialers
h				Automatic identification of outward dialing
i	6			Automatic route selection
j	4			Call forwarding
k	4			Call hold
l	3			Call waiting indication
m				Customer administration center
n	2			Data privacy
o	3			Direct-in-dialing
p	4			Hunting
q	6			Individual call transfer
r	4			Intercom
s	1			Power failure capability
t	4			Pushbutton dialing
u	1			Traffic measurement
v	2			WATS timing
w	2			Queueing
x	2			Intercept
y	3			Out-of-hours arrangements
z	4			Speaker phones
aa	1			Message centers
bb	3			Add-on-conference
cc	3			Speed dialing
dd				System test facilities
ee	2			Camp-on
ff	1			Line lockout/tone denial
gg	1			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii	1			System feature cancellation
jj	1			Training program
kk	1			Installation program
ll	1			Interconnection plans

aaa			Attendant centralized service
bbb			Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee			Call pickup
fff			Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	4

Mail Survey Comments

Replace in-house separate intercom system which is a nuisance and does not work well.

There is only one system for the college and 3 large departments.

WATS line frequently busy.

We need an automated billing system, where calls made can be billed to different in-house accounts by dialing a 3-digit prefix number. This then could be printed out on the monthly WATS charge statement, by account number.

The only thing that we would find helpful is a WATS line that is less often busy.

System (Centrex) OK, but WATS is always busy.

When WATS is heavily used, the circuits malfunction excessively--circuits drop out, call goes through but refuses to ring or complete.

TABLE 32 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION UNIVERSITY OF MONTANA

1979-80 Telephone Expenditures $106,434.39

Number of Questionnaires Mailed 35

Number of Questionnaires Returned _____ (Helena agencies)

22 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	6	8	9	Average number times per day you use State of Montana telephones
2.	13	7	3	Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	20	1		System out of order
b	9	9	5	System busy
c	18	4		System interference
d	18	1	1	Poor turnaround times for labor orders
e	16	3	1	Incorrect billings
f	17	3		Inaccurate or misleading information from vendors
g	5	6	8	Escalating costs
h	16		1	Inadequate possibilities for expanding system
	Yes	No		
4a	16	6		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	21	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	7	13		Has your telephone system grown in last 5 years?
6.	10	12		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	6	7	8	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	3			Area code restriction
b	7			Attendant busy lamp field
c	6			Attendant conference
d	7			Attendant direct station selection
e	5			Attendant intercept
f	3			Attendant recall
g	7			Automatic dialers
h	5			Automatic identification of outward dialing
i	8			Automatic route selection
j	7			Call forwarding
k	9			Call hold
l	9			Call waiting indication
m	4			Customer administration center
n	4			Data privacy
o	6			Direct-in-dialing
p	10			Hunting
q	11			Individual call transfer
r	8			Intercom
s	5			Power failure capability
t	13			Pushbutton dialing
u	5			Traffic measurement
v	7			WATS timing
w	7			Queueing
x	4			Intercept
y	7			Out-of-hours arrangements
z	9			Speaker phones
aa	2			Message centers
bb	9			Add-on-conference
cc	10			Speed dialing
dd	2			System test facilities
ee	4			Camp-on
ff				Line lockout/tone denial
gg	5			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	4			Immediate system response
ii	5			System feature cancellation
jj	3			Training program
kk	4			Installation program
ll	2			Interconnection plans
aaa				Attendant centralized service
bbb				Attendant console
ccc				Interface for long-distance calling
ddd				Call park
eee				Call pickup
fff				Call transfer
ggg				Emergency access to attendant
hhh				Executive override
iii				Line lockout with warning
jjj		1		Loudspeaker
kkk				Miscellaneous trunk restrictions
lll				Radio paging
mmm				Recorded telephone dictation access
nnn				Timed recall on outgoing calls
ooo				Station restriction features
ppp				Data communication access
qqq				Data restriction
rrr				Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
2	1

Mail Survey Comments

Our main expansion in this office has been a definite increase in the number of long-distance calls made per month--an increase of approximately 150% to 200%. Our main problems are the long amounts of time needed to dial a call (lack of pushbuttons and speed dialing and a frequently busy system).

System is adequate.

System old-fashioned and doesn't do all the things a system our size should be able to do.

We have requested an evaluation of our system. A totally new system would cost too much and we can't afford it--but it probably would be a better system than we have. It's unfortunate that this is not a competitive field.

Inability to answer centrally for faculty and to tell who is using the line.

If pushbutton is no more expensive, it would be a great convenience.

Too many busy signals.

We need a centralized department system; more WATS lines.

Costs are too high for what we are getting. Installation costs are much too high.

Outgrown present systems. Too many people using insufficient number of lines. More WATS lines to campus .

This is Nippan equipment and does not interface well with Mountain Bell. We also need a way of tracing calls.

We have a big problem getting the downtown operator the first three weeks of each quarter. More circuits would help this. Your feature "M" would be great, and save the University a great deal in Mountain Bell charges, which is escalating beyond reality.

Expanding needs, development of new programs, and a responsibility for outreach activities.

Some kind of answering service (taped).

Needs more funding; the availability of individual telephones has decreased.

Additional hot line service needed, but to expensive at U of M.

Touch-tone dialing would be a great improvement.

Try the new Horizon system; it seems to have all the capabilities required.

Can't afford any of your options (Question 8).

TABLE 33 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION EASTERN MONTANA COLLEGE

1979-80 Telephone Expenditures $28,546.52

Number of Questionnaires Mailed 25

Number of Questionnaires Returned _____ (Helena agencies)

17 (Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	6	4	7	Average number times per day you use State of Montana telephones
2.	10	5	2	Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	15			System out of order
b	4	9	4	System busy
c	10	3	2	System interference
d	14			Poor turnaround times for labor orders
e	14	1		Incorrect billings
f	11	1		Inaccurate or misleading information from vendors
g	8	4	3	Escalating costs
h	8	3	1	Inadequate possibilities for expanding system
	Yes	No		
4a	12	5		Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	15	1		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	9	5		Has your telephone system grown in last 5 years?
6.	8	9		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	5	8	4	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a	1			Area code restriction
b	2			Attendant busy lamp field
c	2			Attendant conference
d	4			Attendant direct station selection
e	3			Attendant intercept
f	5			Attendant recall
g	5			Automatic dialers
h	1			Automatic identification of outward dialing
i	9			Automatic route selection
j	8			Call forwarding
k	8			Call hold
l	6			Call waiting indication
m	4			Customer administration center
n	3			Data privacy
o	5			Direct-in-dialing
p	9			Hunting
q	8			Individual call transfer
r	6			Intercom
s	5			Power failure capability
t	10			Pushbutton dialing
u	2			Traffic measurement
v	3			WATS timing
w	5			Queueing
x	4			Intercept
y	7			Out-of-hours arrangements
z	6			Speaker phones
aa	1			Message centers
bb	8			Add-on-conference
cc	4			Speed dialing
dd	2			System test facilities
ee	2			Camp-on
ff				Line lockout/tone denial
gg	3			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	3			Immediate system response
ii	2			System feature cancellation
jj	3			Training program
kk	2			Installation program
ll	2			Interconnection plans
aaa				Attendant centralized service
bbb				Attendant console
ccc				Interface for long-distance calling
ddd				Call park
eee				Call pickup
fff				Call transfer
ggg				Emergency access to attendant
hhh				Executive override
iii				Line lockout with warning
jjj				Loudspeaker
kkk				Miscellaneous trunk restrictions
lll				Radio paging
mmm				Recorded telephone dictation access
nnn				Timed recall on outgoing calls
ooo				Station restriction features
ppp				Data communication access
qqq				Data restriction
rrr				Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
5	2

Mail Survey Comments

We would like to see our current Centrex system (unit) updated. We probably would benefit by a campus-wide review of usage and needs in each department and division.

We need more incoming and outgoing lines.

Need new features and new technologies.

Seems to be quite a bit of pressure on current lines--i.e., system busy often.

TABLE 34 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION WESTERN MONTANA COLLEGE

1979-80 Telephone Expenditures $4,740.89

Number of Questionnaires Mailed 10

Number of Questionnaires Returned 2 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.				Average number times per day you use State of Montana telephones
2.	1	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2			System out of order
b		2		System busy
c	3			System interference
d	1			Poor turnaround times for labor orders
e	1			Incorrect billings
f	1			Inaccurate or misleading information from vendors
g	1			Escalating costs
h	1			Inadequate possibilities for expanding system
	Yes	No		
4a	2			Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	2			Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	1			Has your telephone system grown in last 5 years?
6.	1	1		Do you feel that your organization needs a new, or upgraded, telephone system?
	1 yr	2-3 yrs	4-5 yrs	
7.	1		1	How long do you feel you can continue functioning efficiently with the system you currently possess?

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c	1			Attendant conference
d	1			Attendant direct station selection
e	1			Attendant intercept
f	2			Attendant recall
g	1			Automatic dialers
h	1			Automatic identification of outward dialing
i	1			Automatic route selection
j	2			Call forwarding
k	1			Call hold
l	2			Call waiting indication
m	1			Customer administration center
n	1			Data privacy
o	1			Direct-in-dialing
p	1			Hunting
q	2			Individual call transfer
r	1			Intercom
s	1			Power failure capability
t	2			Pushbutton dialing
u				Traffic measurement
v	1			WATS timing
w	2			Queueing
x				Intercept
y	2			Out-of-hours arrangements
z	1			Speaker phones
aa				Message centers
bb	1			Add-on-conference
cc	1			Speed dialing
dd				System test fac[illegible]ies
ee	1			Camp-on
ff	1			Line lockout/to[illegible]enial
gg	2			Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh	1			Immediate system response
ii				System feature cancellation
jj	1			Training program
kk				Installation program
ll				Interconnection plans
aaa				Attendant centralized service
bbb				Attendant console
ccc				Interface for long-distance calling
ddd				Call park
eee				Call pickup
fff				Call transfer
ggg				Emergency access to attendant
hhh				Executive override
iii				Line lockout with warning
jjj				Loudspeaker
kkk				Miscellaneous trunk restrictions
lll				Radio paging
mmm				Recorded telephone dictation access
nnn				Timed recall on outgoing calls
ooo				Station restriction features
ppp				Data communication access
qqq				Data restriction
rrr				Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
1	1

Mail Survey Comment

Time is wasted, especially when using WATS line. There is an inability to transfer incoming calls between offices.

TABLE 35 SURVEY RESULTS:

DEPARTMENT OR ORGANIZATION MONTANA COLLEGE OF MINERAL SCIENCES AND TECHNOLOGY

1979-80 Telephone Expenditures $10,535.70

Number of Questionnaires Mailed 10

Number of Questionnaires Returned 4 (Helena agencies)

(Out-of-town agencies)

Figures represent tallies obtained from mailed survey

	0-2	3-10	11+	
1.	1	1	2	Average number times per day you use State of Montana telephones
2.	3	1		Average number out-of-town calls you make per day
	1	2	3	Problems encountered when using state telephone system
3a	2			System out of order
b	3		1	System busy
c	2	1		System interference
d	2			Poor turnaround times for labor orders
e	2			Incorrect billings
f	2			Inaccurate or misleading information from vendors
g	2			Escalating costs
h	2			Inadequate possibilities for expanding system

	Yes	No	
4a	2	1	Does your organization's telephone system: Permit an acceptable percentage of WATS calls to go out (without a busy signal)?
b	3		Permit an acceptable percentage of in-house calls to through (without a busy signal)?
5.	4		Has your telephone system grown in last 5 years?
6.		4	Do you feel that your organization needs a new, or upgraded, telephone system?

	1 yr	2-3 yrs	4-5 yrs	
7.			4	How long do you feel you can continue functioning efficiently with the system you currently possess.

	Mail Survey	Necessary	Very Desirable	
8a				Area code restriction
b	1			Attendant busy lamp field
c				Attendant conference
d				Attendant direct station selection
e				Attendant intercept
f				Attendant recall
g	1			Automatic dialers
h				Automatic identification of outward dialing
i				Automatic route selection
j				Call forwarding
k				Call hold
l				Call waiting indication
m				Customer administration center
n				Data privacy
o				Direct-in-dialing
p				Hunting
q				Individual call transfer
r	1			Intercom
s	1			Power failure capability
t				Pushbutton dialing
u				Traffic measurement
v				WATS timing
w				Queueing
x				Intercept
y	1			Out-of-hours arrangements
z	1			Speaker phones
aa	1			Message centers
bb				Add-on-conference
cc	2			Speed dialing
dd				System test facilities
ee				Camp-on
ff				Line lockout/tone denial
gg				Distinctive ringing

	Mail Survey	Necessary	Very Desirable	
hh				Immediate system response
ii				System feature cancellation
jj				Training program
kk				Installation program
ll				Interconnection plans

aaa			Attendant centralized service
bbb			Attendant console
ccc			Interface for long-distance calling
ddd			Call park
eee			Call pickup
fff			Call transfer
ggg			Emergency access to attendant
hhh			Executive override
iii			Line lockout with warning
jjj			Loudspeaker
kkk			Miscellaneous trunk restrictions
lll			Radio paging
mmm			Recorded telephone dictation access
nnn			Timed recall on outgoing calls
ooo			Station restriction features
ppp			Data communication access
qqq			Data restriction
rrr			Private line terminal

Response by high-frequency telephone users to Question 6: Do you feel that your organization needs a new or upgraded telephone system?

Yes	No
	2

DISCUSSION

A high percentage of employees returning the questionnaires use the telephone frequently and on a daily basis. This indicates a basic familiarity with the existing telephone system, and would lend validity to their answers. A major concern, however, which is stated frequently on the returned questionnaires, is a lack of knowledge about the specific telephone features listed in Question #8. A more useful selection of a system by individual agencies could be obtained if employees were fully aware of the capabilities and limitations of each feature. A second major concern stated is an uncertainty of the feature's cost-effectiveness. Many respondents qualified their choices of features on a cost-benefit basis, while others selected nearly every feature available. A wide discrepancy in awareness of budgetary considerations could be inferred from this. Interviewed administrators were unanimously concerned about escalating costs. State of Montana and individual agency telephone costs are presented in Tables 36 and 37.

The number of employees returning the questionnaire (212) gives a high reliability to the survey results. It must be noted, however, that wide discrepancies exist within the MSTS. Regions, divisions, and even physical buildings vary widely. Telephony needs and uses are different for individual agencies, and the existing system must be defined with this knowledge at the forefront.

"System busy" is the largest single problem encountered. Interview results indicate some awareness of studies done to determine the percentage of time (TO PAGE 243)

TABLE 36. STATE OF MONTANA TELEPHONE COST COMPARISON FY 1975-80

Fiscal Year	Local Service and Equipment	Long Distance	Installation	Network	Total
1975	$359,657	$145,837	$20,904	$382,947	$ 909,345
1976	405,649	139,982	24,760	401,690	972,081
1977	477,701	178,439	31,320	517,142	1,204,602
1978*	497,917	122,328	27,683	793,874	1,441,802
1979**	673,895	126,719	43,520	751,501	1,595,635
1980	738,100	154,296	73,121	870,427	1,835,944

* Nationwide WATS was non-existent prior to Fiscal Year 1978.

** October 1978 - Billing structure was revised to accommodate computer generated bills. Thereafter, data circuits were billed directly to the agencies. This amounted to approximately $15,000 per month.

All figures obtained from Department of Administration, Communications Division

TABLE 37. AGENCY TELEPHONE COSTS FY 1980

Agency	FY 1980 Telephone Costs	FY 1980 Expenditures/Appropriations	Percentage of Budget for Telephony
LEGISLATIVE BRANCH	$ 29,145.92		
Legislative Auditor	10,526.55	1,378,859	.75
Fiscal Analyst	5,201.52	382,551	1.36
Legislative Council	13,417.85	1,911,347	.70
Legislative Assembly-Senate	786.53		
Legislative Assembly-House	1,029.30		
Environmental Quality Council	2,886.68	134,412	2.14
Consumer Council	3,253.81	441,560	.74
Supreme Court	12,902.13	2,340,537	.55
GOVERNOR'S OFFICE	56,004.42		
Governor	26,374.87	2,356,200	
Governor's Office of Commerce	6,884.88		2.38
Governor's Office - Budget Div.	11,084.48		
Powder River	2,625.18		
Lieutenant Governor	6,217.71		
Governor's Office - Citizens Adv.	1,992.70		
Board of Visitors	824.60		
Secretary of State	6,891.12	559,606	1.23
Campaign Finances	2,212.90	83,661	2.64
Auditor's Office	19,408.02	1,433,869	1.35
Supt. of Public Instruction	95,002.92	4,305,218	2.21
Crime Control	15,271.27	3,864,686	
JUSTICE	79,907.98	12,260,430	.26
Attorney General	15,936.64		
Highway Patrol	22,848.67		
Registrar of Motor Vehicles	7,314.25		
Criminal Investigator	2,412.99		
Justice Department	31,395.43	12,260,430	

(continued)

TABLE 37 (continued)

Agency	FY 1980 Telephone Costs	FY 1980 Expenditures/Appropriations	Percentage of Budget for Telephony
Public Service Regulation	19,158.87	1,109,315	1.73
Board of Public Education	3,044.93	192,904	1.58
Higher Education	16,297.53	576,287	2.83
University of Montana	106,434.39	20,816,217	.51
MONTANA STATE UNIVERSITY	177,987.13	22,895.532	.78
Montana State University	165,809.17		
MSU-School of Nursing	4,341.72		
MSU-Civil Engineering	7,476.24		
MSU-Miles City Exp. Station	360.00		
Montana College of Min. Sci. Tech	10,353.70	3,046,594	.35
Eastern Montana College	28,546.52	7,273.640	.39
Northern Montana College	9,174.76	3,233,016	.28
Western Montana College	4,740.89	2,016.944	.24
School for Deaf and Blind	2,796.11	1,613,402	.17
Montana Arts Council	3,049.56	297,305	1.03
Library Commission	6,190.24	916,284	.68
Vocational Education Council	1,500.04		
Historical Society	12,172.82	1,001,556	1.22
Fish, Wildlife and Parks	88,894.83	13,306,752	.67
Health	133,765.28	17,688,829	.76
Highway	211,289.28	202,082,856	1.05
State Lands	22,358.69	7,172,760	.31
Livestock	42,576.22	2,951,237	1.44
DEPT. NATURAL RES. & CONS.	86,221.42	16,990,797	.42
Natural Resources	72,069.35		
Oil and Gas	4,483.33		
Forestry	9,668.74		

(continued)

TABLE 37 (continued)

Agency	FY 1980 Telephone Costs	FY 1980 Expenditures/Appropriations	Percentage of Budget for Telephony
Revenue	103,506.57	21,889,076	.47
ADMINISTRATION	72,072.36	18,268,048	.39
Director's Office	3,628.22		
Accounting	5,057.88		
A & E	3,485.97		
Publications and Graphics	1,937.25		
Information Systems	4,834.23		
Data Processing	45,414.54		
General Services	7,715.27		
Purchasing	5,937.81		
Building Codes	6,167.89		
Treasurer's	3,415.46		
Board of Housing	7,987.21		
Board of Investments	4,832.22		
Communications	7,534.23		
Personnel Division	17,106.45		
Insurance and Legal	2,491.44		
Records Management	1,375.40		
Workers Comp. Judge	2,627.86		
PERS	7,680.14		
Teachers' Retirement	2,193.61		
State Tax Appeals Board	2,503.57		
Agriculture	26,550.23	2,675,827	.99
Business Regulation	9,840.23	1,209,940	.81
INSTITUTIONS	97,279.56	49,546,410	.20
Institutions	85,549.03		
Aftercare	7,412.33		
Mental Health	1,848.00		
Adult Probation and Parole	2,470.20		
Boulder River School	9,138.22	7,724,152	.19

(continued)

TABLE 37 (continued)

Agency	FY 1980 Telephone Costs	FY 1980 Expenditures/Appropriations	Percentage of Budget for Telephony
Center for the Aged	4,439.06	1,479,781	.30
Galen State Hospital	4,399.66	4,594,997	.09
Mountain View School	2,809.54	1,142,731	.25
Pine Hills School	3,602.88	2,096,952	.17
Montana State Prison	2,400.00	6,883,217	.03
Warm Springs State Hospital	9,857.82	9.651,161	.10
Montana Drug Program	3,092.34		
Dept. of Community Affairs	92,494.43	10,239,908	.90
LABOR AND INDUSTRY	42,349.47	2,319,677	1.83
Labor Standards	35,385.13		
Human Rights	6,964.34		
Employment Security Division	100,280.83	12,223,654	.82
Workers Compensation	51,214.31	4,522,228	1.13
Military Affairs	59,881.75	963,619	6.21
Disaster and Emergency	8,918.14	365,340	2.44
Professional & Occup. Licensing	16,697.25	1,142,796	1.46
SRS	190,929.24	56,657,710	.37
D.D. Advisory Council	1,805.31		
Veterans Affairs Division	1,124.22		
Administration	143,927.64	18,268,048	.79
Labor and Industry	193,844.61	2,319,677	
5 University		65,190,684	1.02

All FY 1980 telephone costs obtained from Dept. of Administration, Communications Division
All FY 1980 total expenditures/appropriations or General Fund appropriation figures obtained from Appropriations Report 1981 Biennium

telephone lines are busy, but again, budgetary considerations are paramount to the decision to add extra lines. Frequent requests were made in the interviews that a method of evaluating existing systems and alternative systems be made available to management personnel. This should be pursued.

While a total of 64 percent of the respondents indicate "System busy" as an often or very frequently encountered problem, 66 percent respond that the percentage of WATS calls that get through is acceptable; an even larger percentage (86%) are positive about in-house calls. Perhaps employees view busy telephone lines as an acceptable problem? This hypothesis is reinforced by the 66 percent who respond that a new or upgraded system is not needed immediately (80 percent of the respondents feel they can continue functioning efficiently for 2-5 years with their current systems). The single most selected item, however, is "Hunting," a feature which allows the switch to hunt from a busy circuit to a clear circuit in completion of a call. Automatic route selection follows closely in popularity, a feature which finds the cheapest long-distance route. Here again, a busy system and financial awareness are shown.

The existing telephone management and billing method is cited as a problem by many of the interviewed administrators. The long-distance calls record permits widespread abuse of the system. Personal calls can account for a great deal of "system busy" time. A need to remediate these problems is frequently expressed.

RECOMMENDATIONS

The next phase of the telephony needs assessment involves developing a concrete management level means of evaluating individual telephony systems. The Telecommunications Project or the Communications Division can coordinate and evaluate these individual assessments to ensure efficiency. Management should place the emphasis on choosing alternatives which offer the best combination of acceptability, system effectiveness, and feasible cost of ownership.

The management level planning and evaluation process can be organized following these interrelated steps or phases:

GOALS: Establish goals and objectives.

REQUIREMENT: Examine local, state and national telecommunications ordinances.

Establish which of the standards must be met.

Compare goals with local, state and national telecommunications plans.

Identify possibilities for interagency cooperation.

TASKS: Identify available resources.

Conduct a literature search.

Familiarize participants with existing system, including equipment capabilities and costs.

Document current system parameters.

Establish physical capabilities of buildings for new components or systems.

Examine similar systems.

Examine newer systems.

Distribute goals and objectives for review and comment.

Consult system users.

Design a means of collecting necessary data.

Collect and analyze data.

Review goals.

Establish implementation priorities.

COSTS: Perform: investment cost analysis
operating cost analysis
cost-savings analysis
cost-benefit analysis

EVALUATION: Evaluate results in terms of goals.

Establish a regular assessment of system priorities and goals.

Implement system according to goal priorities.

The potential for abuse of the MSTS is great. Management and billing techniques frequently do not encourage responsible use of the telephones. One solution to the problem might be to monitor employees closely, holding each person accountable for every phone call. Another, less costly and time-consuming method might be a comprehensive training seminar, in which employees are given full knowledge of telephone costs, and instructions on how best to use the system, stressing costs, time of day, length of call, efficiency of information transfer, and functional capabilities of the system. This alternative might be very effective, both for limiting abuses and for employee efficiency. The use of telecommunications in place of traveling increases yearly, and telephone skills become more important every day.

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1. Who manages your telephone system?

2. What types of problems have you encountered in managing your telephone system?

Problem	Infrequent	Often	Very Frequent
a. Poor turnaround times for labor orders			
b. Incorrect billings			
c. Inaccurate or misleading information from vendors			
d. Escalating costs			
e. System down-time			
f. System busied out			
g. Inadequate expansion capability			
h. System interference			
i. "Facilities" inadequacy			
j. Other (specify) _____			
k. Other (specify) _____			

3. Has the trend in your management problems become more serious with the passage of time?

4. How has your system grown in the past five years?

5. How long do you feel you can continue functioning with the system you currently possess?

6. Does your organization's telephone system:

   a. Permit an acceptable percentage of WATS calls to go out (without a busy signal)?

   b. Permit an acceptable percentage of in-house calls to go through (without a busy signal)?

7. What would you like your telephone system to be able to do? (See list on following pages) Please consider these features in terms of

Necessary for Efficiency in the Department	Terrific Feature Which Would Make Life More Pleasant	Unnecessary or Unwanted

a. Area Code Restriction (prevents calls from being directed outside a specified area code)

b. Attendant Centralized Service (allows all calls to be handled at one central location)

c. Attendant Conference (Simultaneous connection for up to six parties plus attendant)

d. Attendant Console (Desk-top position from which attendant handles calls. Provides display which assists in identifying incoming and outgoing calls)

e. Attendant Direct Station Selection (refers to manner in which operator completes calls)

f. Attendant Intercept

g. Attendant Recall

h. Automatic Dialers

h(a) Automatic Identification of Outward Dialing (automatic record of toll calls by stat'r

i. Automatic Route Selection (selects least expensive trunk for outgoing calls)

j. Automatic Station Restriction (prevents unauthorized phone calls from vacant rooms)

k. Call Forwarding (Redirects incoming calls to any other customer-selected station in the system, or redirects incoming calls when station is busy and/or unattended)

l. Call Hold

m. Call Park (allows a station user to place a call on hold and regain access to it at another station)

n. Call Pickup (allows a station user to answer other ringing stations within a pickup group)

o. Call Transfer (capability of a station to send an incoming call to another station, after first conversing with caller)

p. Call Waiting (attendant alerts busy party to waiting call)

q. Customer Administration Center (permits customer to administer station and system features remotely and locally (such as number changes)

r. Data Communication Access (provides direct-dial access to computer equipment)

s. Data Privacy (prevents interference on data transmissions--user controlled)

t. Data Restriction (restricts station for data transmission--software controlled)

u. Direct Department Calling (handles incoming calls for selected departments without attendant involvement)

v. Distinctive Ringing (unique patterns allow station users to distinguish various types of calls)

w. Echo Suppressor (minimized "echo" in system transmission. Used primarily when transmitting data)

x. Emergency Access to Attendant (priority handling of emergency calls)

y. Energy Communication Service (permits customer to manage energy use via shedding, cycling, and time-of-day functions)

z. Executive Override (following a warning tone, a selective user may access an existing two-way conversation)

aa. Foreign Exchange Access (access to foreign exchange trunks)

bb. Immediate System Response (quick system reaction to command)

cc. Individual Call Transfer (capability of a station to send an incoming call to another station, after first conversing with caller)

dd. Installation Program (clarifies vendor's installation program)

ee. Intercept Treatment (routes calls which cannot be completed to attendant, tone, or recorded message)

ff. Intercom System (installed on telephone unit)

gg. Interconnection Plans (clarifies vendor's plan and responsibility to connect switch to bell network)

hh. Interface for Long Distance Billing (stores, displays, and prints billing information)

ii. Line Lockout with Warning (tone warns when station is off hook and holds line out of service)

jj. Loudspeaker Paging (gives attendant direct (and station user dial) access to paging equipment)

kk. Message Centers (system capability to call forward multiple circuits to one station)

ll. Miscellaneous Trunk Restrictions (prohibits dialing to pre-selected trunk groups)

mm. Power Failure Capability (provides limited service to the exchange system during commercial power failure)

nn. Privacy and Lockout (denies attendant re-entry on a completed call unless recalled by station user)

oo. Private Line Termination (optional access to and termination from private networks)

pp. Protection and Alarms (refers to an alarm configuration for the switch)

qq. Pushbutton Dialing (self-explanatory)

rr. Radio Paging Access (allows dial access to customer-provided radio paging equipment)

ss. Recorded Telephone Dictation Access (to customer's centralized dictation equipment)

tt. Remote Maintenance, Administration and Traffic System (permits off-site data polling of the PBX by the telephone company)

uu. Speaker Phones (self-explanatory)

vv. Speed Dialing (capability for a single digit to represent multiple digits for quicker dialing)

ww. Station Hunting (allows switch to hunt from a busy circuit to a clear circuit in completion of a call)

xx. Station Message Detail Recording (records system communication activity)

yy. Station Restriction Features (control and limit of call usage: fully restricted; inward restriction; origination restriction; outward restriction; termination restriction)

zz. Station-to-Station Calling (direct dial within system without attendant)

aaa. System Feature Cancellation (allows for system-wide cancellation of a particular feature)

bbb. Three-Way Conference Transfer (brings third party into two-way conversation)

ccc. Timed Recall on Outgoing Calls (outgoing trunk calls are automatically routed to attendant after specified interval)

ddd. Toll Restriction (restricts direct-dial toll calls)

eee. Training program (clarifies vendor's training program)

fff. Traffic Recording Devices (records switching system traffic)

ggg. Trunk Queueing (automatically notifies users when a previously busy trunk line is available)

hhh. Trunk Verification by Attendant (attendant can determine working condition of trunk lines)

iii. Visually Impaired Attendant Service (tactile devices or audible signals on attendant position to allow visually impaired individual to operate an attendant console)

jjj. WATS (Wide Area Telecommunications Service) Access to or from WATS serving offi

kkk. WATS Timing Device (self-explanatory)

DEPARTMENT OF ADMINISTRATION
TELECOMMUNICATIONS PROJECT

TED SCHWINDEN, GOVERNOR

ROOM 227, SAM W. MITCHELL BUILDING

STATE OF MONTANA

(406) 449 4564

HELENA, MONTANA 59620

To: Selected State of Montana Employees
From: Beverly R. Magley
Survey and Research Analyst
Re: State of Montana Telephone System
Date: May 21, 1981

The Montana Telecommunications Project is currently researching the state's telephone system. In order to gain a thorough understanding of the overall system, we need information on telephone usage from employees throughout Montana.

We have selected persons representing every state department, employed in a wide variety of jobs. You are one of the 500 employees chosen to fill out the enclosed survey questionnaire.

Some employees who receive this may rarely use the telephone in their job capacity; others may use telephones with great frequency. We are interested in the information you return to us regardless of how often you use the state telephone system.

Please fill out the questionnaire immediately, and return it to us in tomorrow's mail. Enclosed is a stamped envelope for your convenience.

Your participation will give us valuable information for our project.

Thank you.

Beverly R. Magley

STATE OF MONTANA TELEPHONE SYSTEM
EMPLOYEE QUESTIONNAIRE

May 21, 1981

Department of _____

Division or Agency _____

Your Job Title _____

1. Please circle the average number of times per day that you use the State of Montana telephones.

0-2	3-10	11+

2. What is the average number of out-of-town calls you make per day?

0-2	3-10	11+

3. What types of problems have you encountered when using the state telephone system?

	Infrequent	Often	Very Frequent
a. System out of order	1	2	3
b. System busy	1	2	3
c. System interference	1	2	3
d. Poor turnaround times for labor orders	1	2	3
e. Incorrect billings	1	2	3
f. Inaccurate or misleading information from vendors	1	2	3
g. Escalating costs	1	2	3
h. Inadequate possibilities for expanding system	1	2	3
j. Other (specify)	1	2	3

_____

_____

_____

_____

4. Does your organization's telephone system:

   a. Permit an acceptable percentage of WATS calls to go out (without a busy signal)?

      ☐ Yes No ☐

   b. Permit an acceptable percentage of in-house calls to go through (without a busy signal)?

      ☐ Yes No ☐

5. Has your telephone system grown in the last five (5) years?

   ☐ Yes No ☐

   Briefly describe the growth

   _____

   _____

   _____

   _____

6. Do you feel that your organization needs a new, or upgraded, telephone system?

   ☐ Yes No ☐

   If yes, why?

   _____

   _____

   _____

   _____

7. How long do you feel you can continue functioning efficiently with the system you currently possess?

   1 year 2-3 years 4-5 years

8. What would you like your telephone system to be able to do? (Check as many as would enable you to perform your job <u>most</u> efficiently.)

☐ a. Area code restriction

☐ b. Attendant busy lamp field

(continued on next page)

- [ ] c. Attendant conference
- [ ] d. Attendant direct station selection
- [ ] e. Attendant intercept
- [ ] f. Attendant recall
- [ ] g. Automatic dialers
- [ ] h. Automatic identification of outward dialing
- [ ] i. Automatic route selection (finds cheapest long distance route)
- [ ] j. Call forwarding (capability of a station to have its own incoming calls sent to another station, without conversing with caller)
- [ ] k. Call hold
- [ ] l. Call waiting indication
- [ ] m. Customer administration center (allows customer to number change phones and alter feature access to phones)
- [ ] n. Data privacy
- [ ] o. Direct-in-dialing (refers to a system designed so that calls coming in from the outside world do not have to pass through an operator's position, but instead terminate in the called station)
- [ ] p. Hunting (allows switch to hunt from a busy circuit to a clear circuit in completion of a call)
- [ ] q. Individual call transfer (capability of a station to send an incoming call to another station, after first conversing with caller)
- [ ] r. Intercom
- [ ] s. Power failure capability (refers to switch's strategy of coping with a power failure)
- [ ] t. Pushbutton dialing
- [ ] u. Traffic measurement
- [ ] v. WATS timing
- [ ] w. Queueing (refers to switch's capability to notify users of clear trunks)
- [ ] x. Intercept (system throws calls to dead or unassigned circuits to operator's position)

(continued on next page)

- [ ] y. Out-of-hours arrangements (throws calls after hours to central position)
- [ ] z. Speaker phones
- [ ] aa. Message centers (refers to system capability to call forward multiple circuits to one station)
- [ ] bb. Add-on-conference (capability of a station to add a third party to a conversation, without attendant assistance)
- [ ] cc. Speed dialing (capability for a single digit to represent multiple digits for quicker dialing)
- [ ] dd. System test facilities (refers to switch's capability to be tested for functionality by local administrators)
- [ ] ee. Camp-on (introduces signal to circuit to announce waiting call)
- [ ] ff. Line lockout/tone denial (prevents above, data use)
- [ ] gg. Distinctive ringing (discriminates as to differing call originations)
- [ ] hh. Immediate system response (quick system reaction to command)
- [ ] ii. System feature cancellation (allows for system-wide cancellation of a particular feature)
- [ ] jj. Training program (clarifies vendor's training program)
- [ ] kk. Installation program (clarifies vendor's installation program)
- [ ] ll. Interconnection plans (clarifies vendor's plan and responsibility to connect switch to bell network)

9. Are there any additional comments you would like to make? We welcome your suggestions and comments.

_____

_____

_____

_____

_____

_____

_____

REPORT TO THE

MONTANA TELECOMMUNICATIONS PROJECT

Land/Mobile Needs Assessment for Beaverhead County and the City of Dillon

Analysis and Recommendations for the Land/Mobile Needs Assessment Methodology

Prepared by

Beverly R. Magley
April 20, 1981

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I. INTRODUCTION

One goal of the Telecommunications Project is the development of a method of assessing the telecommunications needs of Montana local governments. This can be accomplished, in part, by collecting information regarding Montana's existing land/mobile radio system capabilities, and identifying the perceived needs of land/mobile radio system users. It is these areas which are dealt with in this report.

The study serves a dual purpose: (1) to gather the actual data generated by the users of a working land/mobile radio system within Beaverhead County; and (2) to assess and critique the draft methodology, suggesting revisions and clarifications for the interview process.

A. GENERAL INFORMATION: BEAVERHEAD COUNTY

Beaverhead County is located in the extreme southwest corner of the state of Montana. The county borders the State of Idaho to the west and the south; Madison County and Silver Bow County to the east; and Deer Lodge, Ravalli, and Granite Counties to the north.

Beaverhead County is a large county, with 5,551 square miles of area. Its mountainous terrain is sparsely populated, and approximately 75 percent of its population of 8,204 is located in or near the county seat of Dillon (elevation 5406). 1980 census figures project almost no change in population for 1990 and 2000. The taxable valuation of the county in 1980-81 is $17,947,567, an increase of $1,562,229 since 1979-80 (see Appendix A).

Ranching continues to be the primary industry in Beaverhead County with one-half of the total land of the county in livestock ranching, and general farming and irrigation. Primary products from these industries are cattle, sheep, hay, wheat, and barley. Forest covers much of the remaining land, with predominant forest types of lodgepole pine and Montane (white pine, Douglas fir, spruce fir). Silver, lead, gold, thorium and iron have been developed in the county. There is currently some oil exploration in the Big Hole area and iron ore exploration near Dillon. Neither of these have been developed.

Beaverhead County averages 10"-18" of precipitation per year. Major mountain ranges are the Bitterroot, the Beaverhead, the Centennial and the Pioneer Mountains, the latter rising over 9000'. Primary rivers are the Big Hole, the Beaverhead, the Wise,and Red Rock River. Dams on the Red Rock River have created the Lima reservoir and Clark Canyon Recreation Area (Hap Hawkins Lake).

Interstate Route #15 passes northsouth through Beaverhead County and Dillon. Principal and secondary highways give access to neighboring counties. Burlington Railroad services Dillon, the major economic center of the county. There is a general aviation airport near Dillon.

II. EXISTING COMMUNICATIONS SYSTEM: CITY OF DILLON AND COUNTY OF BEAVERHEAD

This section contains the information collected in Beaverhead County and the City of Dillon. The data for each department or agency is presented individually. All interviews were conducted with departmental supervisors unless otherwise noted.

The draft methodology was used with no revisions except to drop non-applicable questions or forms where the interviewer determined them to be irrelevant to the particular department or agency. The topics discussed were: general information; land/mobile system identification, organizational structure and demographic data; communication system functions; user access; dispatch data for telephone and for radio; computer terminal functions; maintenance; problem reviews; and suggested improvements.

All interviews were conducted in a face-to-face situation with a minimum of interruption. Some questions needed to be clarified or reworded; all answers were recorded as the interview progressed. At times the answer was read back to the interviewee to confirm the accuracy of the recorded statement. Form 5N, concerned with itemizing the functions of each separate agency, was totally dropped from this report. I determined the data collection and time involved in satisfactorily completing this task to be beyond the scope of this project. Appendix B contains partial lists of law enforcement agency and emergency medical systems functions.

As an alternative to completing Form 5N, I designed for each agency/department a diagram of their own communication systems, and the contacts that they were most likely to make. These diagrams are only as comprehensive as the information which I collected through the series of personal interviews with agency/department supervisors. Data from the physical inventory will certainly aid in the construction of more complete and accurate telecommunications system drawings.

Departmental officials or representatives who were interviewed for the project are:

Beaverhead County

County Commission - Bob Miller, Commissioner
Sheriff's Department - Rick Later, Sheriff
Central Dispatch System - Margie Stefanatz
Search and Rescue - Mike Shafer, Commander
Emergency Medical Services - Gale Murray, President
Volunteer Fire Department - Mike Swetish, Chief
Civil Defense - Roger Johnson, Director

City of Dillon

Mayor - Ray Lynch
Police Department - Tom Depew, Chief
Engineer - Bob Cottom

Beaverhead Electronics - Harvey Lake, Owner

II. A. Sheriff - Rick Later
Head Dispatcher - Margie Stefanatz

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency Beaverhead Central Dispatch System (CDS)

Agency function (i.e. law enforcement, . . .) to receive and dispatch all information to participating departments and agencies.

Address Beaverhead County Courthouse - Dillon, Mt. 59725

Telephone 683-2383/2333/2311

Manager/Communications N/A

Communications Engineer/Planner/Technician Harvey Lake, Beaverhead Electronics

Other key personnel:

Head Dispatcher - Margie Stefanatz

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [x] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch. Beaverhead County

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

- Governmental Entity Organization Structure (Form 1N)
- Agency/Department Management Structure (Form 2N)
- Special Interagency Relationships (Form 3N)

  NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

   NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

   - Who are the primary and secondary clients of the defined system? See Communications diagram

   - What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? City and county authorized

     Yes

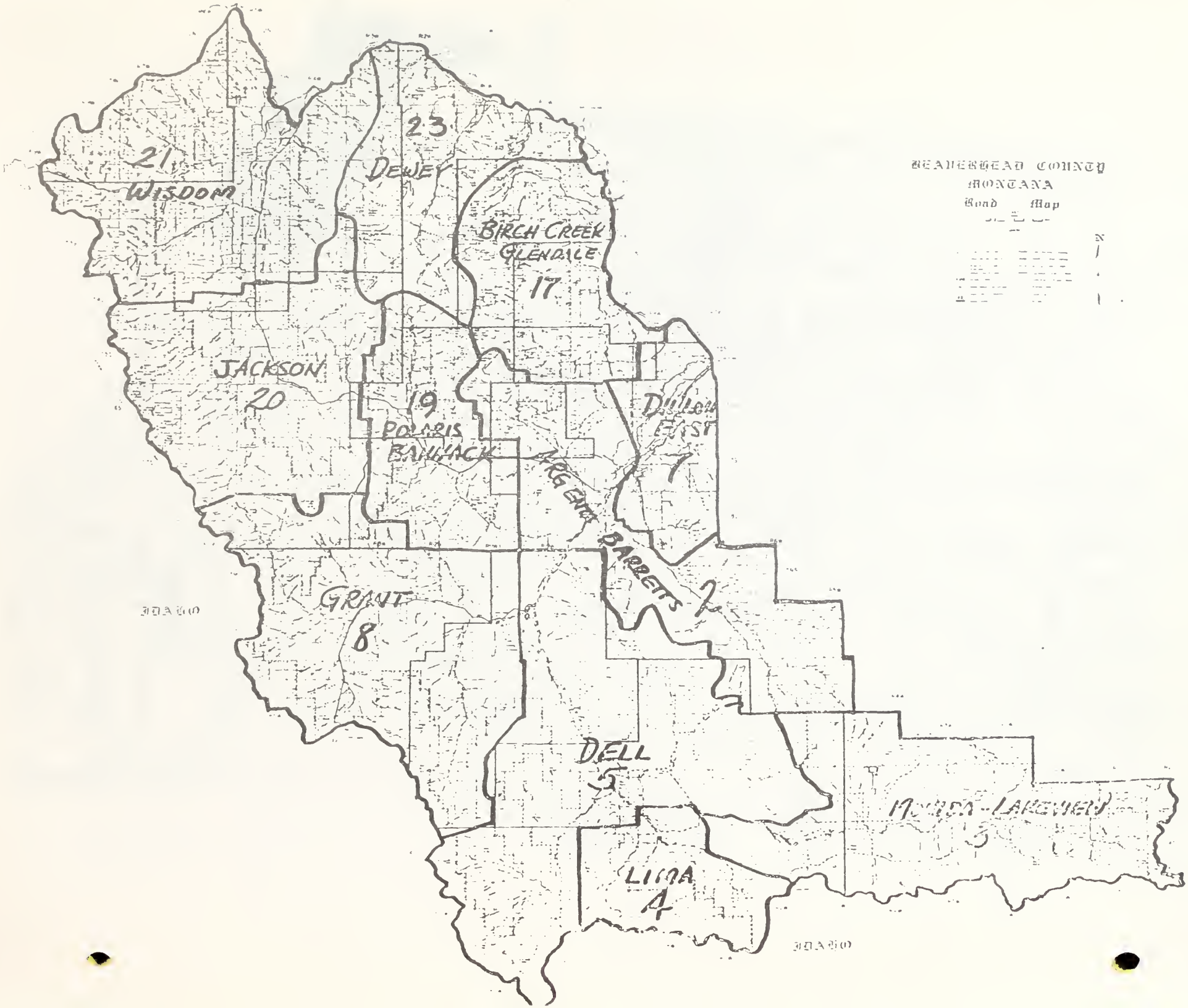
   - How is the quality of service measured to insure compliance with legal mandate? Sheriff oversees operations

   - Is an annual report available for the department or agency?

     [ ] Yes [X] No / Written logs are kept and could be seen.

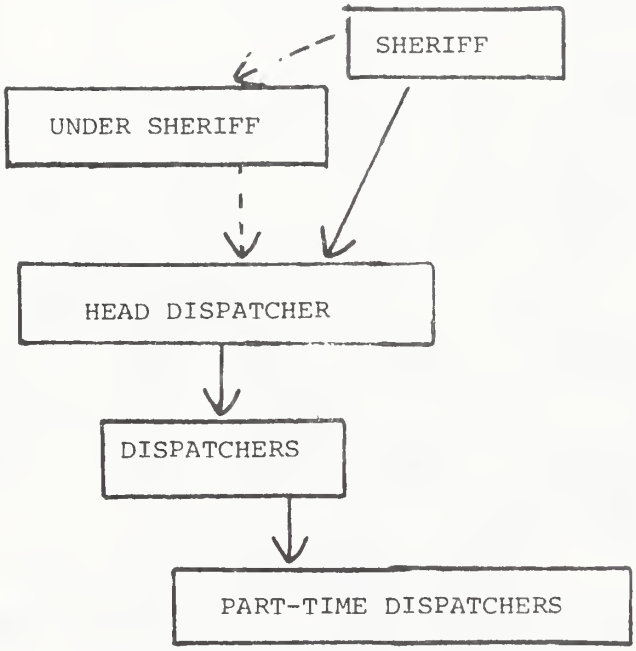
MONTANA

LINCOLN
LIBBY
FLATHEAD
KALISPELL
GLACIER
CUT BANK
TOOLE
SHELBY
LIBERTY
CHESTER
HILL
HAVRE
CHINOOK
BLAINE
MALTA
PHILLIPS
VALLEY
GLASGOW
SCOBEY
DANIELS
PLENTYWOOD
SHERIDAN
ROOSEVELT
WOLF POINT
PONDERA
CONRAD
CHOUTEAU
FORT BENTON
TETON
CHOTEAU
LAKE
POLSON
SANDERS
THOMPSON FALLS
LEWIS AND CLARK
GREAT FALLS
CASCADE
STANFORD
JUDITH BASIN
FERGUS
LEWISTOWN
PETROLEUM
WINNETT
GARFIELD
JORDAN
MCCONE
CIRCLE
RICHLAND
DAWSON
GLENDIVE
PRAIRIE
TERRY
SUPERIOR
MINERAL
MISSOULA
MISSOULA
POWELL
HELENA
MEAGHER
WHITE SULPHUR SPRINGS
HARLOWTON
WHEATLAND
GOLDEN VALLEY
RYEGATE
MUSSELSHELL
ROUNDUP
HYSHAM
TREASURE
FORSYTH
ROSEBUD
MILES CITY
CUSTER
GRANITE
PHILIPSBURG
DEER LODGE
TOWNSEND
BROADWATER
DOULDER
HAMILTON
ANACONDA
DEER LODGE
BUTTE
SILVER BOW
JEFFERSON
RAVALLI
GALLATIN
BOZEMAN
LIVINGSTON
SWEET GRASS
BIG TIMBER
STILLWATER
COLUMBUS
YELLOWSTONE
BILLINGS
HARDIN
BIG HORN
POWDER RIVER
BROADUS
MADISON
VIRGINIA CITY
PARK
CARBON
RED LODGE
BEAVERHEAD
DILLON

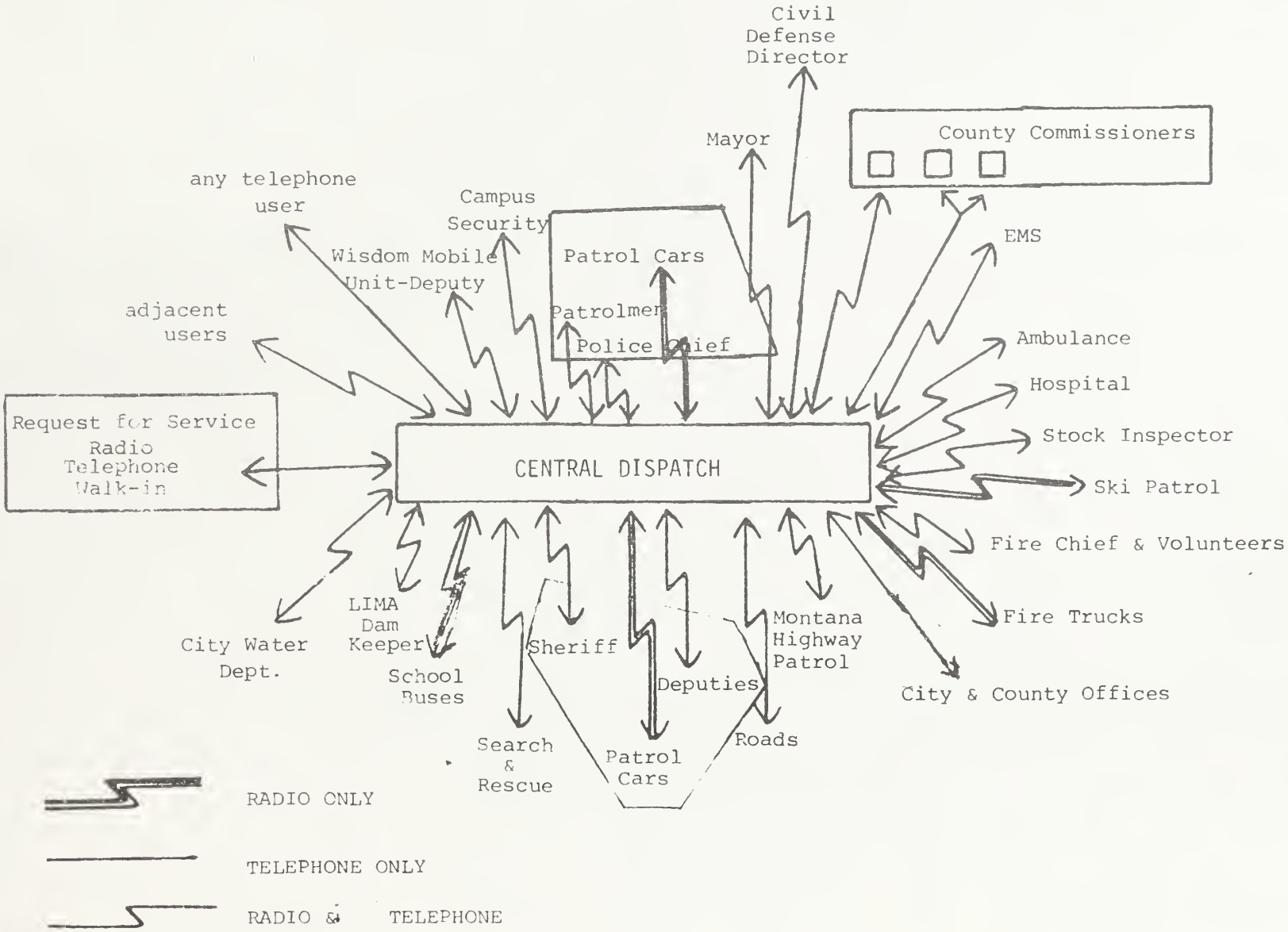

BEAVERHEAD COUNTY
MONTANA
Road Map
N
21
WISDOM
23
DEWEY
BIRCH CREEK
GLENDALE
17
JACKSON
20
19
POLARIS
BANNACK
DILLON
EAST
7
BARRETT'S
2
GRANT
8
IDAHO
DELL
5
MONIDA-LAKEVIEW
3
LIMA
4
IDAHO

CENTRAL DISPATCH SYSTEM
ORGANIZATIONAL STRUCTURE

Form 2N



CENTRAL DISPATCH SYSTEM
BEAVERHEAD COUNTY
COMMUNICATION SYSTEM



FORM 6N

TELEPHONE ACCESS SYSTEM DATA

o Name of telephone service provider (i.e., common carrier - Bell, GTE, . . .)

MOUNTAIN BELL

o Does department have separate emergency and administrative phone numbers?

[ ] Yes [X] No

1. If no, how many incoming lines are there? Eight (8)
2. If yes, how many incoming lines are there for: Emergency _____

   Administration _____
3. Does the department utilize 911? ___ Yes X No

   If yes, explain: Expect to utilize 911 next year.
4. How many unlisted number lines does the department have for its own business? Sheriff 1/Fire 0/Police 1/
5. Are telephone lines recorded? Yes [ ] No [X]

o What is the volume of phone calls? (Enter below.)

Telephone Number	Total Number of Calls 4 MONTHS		Total Number of Calls During Monitored Busy Period POLICE & SHERIFF ONLY	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
	1,343	1,665	37	1

Length of Busy Period (Hours) 5 hours

Time and Date of Monitoring 8/25 - 9/7/80
9 p.m.-2 a.m.

NOTE: See Appendices I, II, and III if telephone volume data is not available and must be collected.

FORM 6N (Continued)

- What percent of the time are all lines busy? (If possible, obtain from telephone company percent of calls which received a busy signal.) (answer is below)*
- What are the costs? (Enter below.) N/A for telephone only

TOTAL SYSTEM COSTS: $67,592.76 FY80-81

Type of Line	Installation	Monthly
Emergency		
Administrative		

- Is there any backup telephone equipment? Yes [X] No [ ]

  If yes, describe backup. Mountain Bell has auxiliary Power Plant.

- Do the operators handle tephone calls for other services (e.g., fire, public works)? Yes [X] No [ ]

  If yes, which services? Sheriff
  Fire
  Police
  EMS
  Civil Defense
  Search & Rescue
  Head Dispatcher
  County Commissioner

*Sheriff estimates that the "lines" are busy about once in a month. He believes that it is the circuit 23__ which gets busy, since the sheriff, the police and the hospital numbers all begin with 23__.

Beaverhead County officials would have to formally request Mountain Bell to monitor the lines. Mountain Bell will do that as a customer service.

FORM 7N

SERVICE/COMPLAINT SYSTEM DATA

0 User Access

1. In the department, who answers initial service or complaint calls (i.e., secretary, clerk, switchboard operator, dispatcher, . . .)?
   Secretary: 8AM-5PM Mon-Fri answers - Dispatchers answers all others 24 hrs/day walk-ins.

2. What percent are received via telephone 54% (3,008), radio 35% (1,995), and walk-in 11% (617)?

3. Number of complaint positions (total). Six (6). Four full-time & five part-time.

4. What is the position-manning schedule? 7AM-3PM/3PM-11PM/11PM-7AM
   7 days a week

5. Describe capabilities provided at each position?
   - Position No. 1
   - Position No. 2

6. Does the complaint taker maintain some type of status system (i.e., board, file, . . .)? X Yes ___ No Explain: Keep record log of all communications transactions involving telephone or radio.

7. What special emergency procedures are set-up for the service/complaint room? Dispatcher has 7 day-24 hour contact with: Sheriff, undersheriff, one deputy, and police chief, via pagers.

8. Describe any other activity in the service/complaint room besides the taking of service requests or complaints. (1) Monitor the jail via closed circuit television (2) Dispatch messages

9. How do messages get from the call taker to the dispatcher? same person

FORM 8N

DISPATCH SYSTEM DATA

o Dispatch Facilities Data

1. Number and location of dispatcher positions? One position in dispatch room

2. What is the dispatch position manning schedule? 7AM-3PM; 3PM-11PM: 11PM-7AM 7 days/week

3. Describe capabilities provided at each position.

   - Position No. 1 _____
   - Position No. 2 _____
   - Position No. 3 _____

4. Does the dispatcher have supervisory control over remote transmit locations? ☐ Yes ☐ No

5. Does the dispatcher switch these locations in and out, or are they connected at all times? _____

6. Are radio channels recorded? ☐ Yes ☒ No

o Resource Control Data

1. Who selects service response? Dispatcher
2. Who services or prepares complaint form? Dispatcher
3. Who marks service unit back in service? Dispatcher

4. How many status levels (i.e., available, enroute, on assignment, out of service, . . .) are there for field personnel? N/A

5. What are they? _____

6. Are any levels of status of low priority so that a man assigned to a lower level complaint can be reassigned to a higher level complaint? Yes [X] No [ ]

7. Describe the status level priorities and who decides to reassign a man. Emergency calls receive priority.

8. Are there any priorities assigned to complaint assignments (e.g., immediate dispatch, delayed dispatch). Yes [ ] No [X]

9. If yes, describe the priorities and how the priority of a complaint is determined, and then communicated to services provided. Sheriff or the officer on duty decides to reassign personnel. The dispatcher makes the primary response judgment. Personnel arriving at call location assess the situation and request support if determined necessary.

o Dispatch Volume Data

1. What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages 4MONTHS	Total Number of Messages During Monitored Busy Period	Average Radio System Delay During Busy Period (seconds)
KXK 427	1787	87	No record
WAH 92	128		
KLV 872	62		
WCU 966	18		

Length of Busy Period (hours) 5 hrs. each

Time and Date of Monitoring 8/25 - 9/7/80 9PM-2AM Police & Sheriff only

NOTE: See Appendices I, III, and IV if radio volume and message length data is not available.

2. What was the average message length N/A seconds?

3. Does the dispatcher handle radio messages for other services (e.g., fire, public works)? [x] Yes [ ] No

4. If yes, which services? Sheriffs' Dept./Police Dept./Fire Dept./MT. Highway Patrol/ Fish & Game/EMS/Search & Rescue/Stock Inspector/Civil Defense/Ambulance/ County Roads Crew/Ski Patrol/Hospital/County Commissioners/Mayor/

5. Other data: Campus Security/Wisdom Mobil Unit-Deputy/City Water/Lima Dam Keeper/School buses

FORM 9N

COMPUTER TERMINAL SYSTEM DATA

o Computer Terminal Facilities Data

1. List below the computer and/or teletypewriter terminals the agency uses. Be sure to indicate if a terminal is shared between two or more networks or information retrieval systems. _____

(NLETS & NCIC) One teletype terminal

2. Who operates the terminals? Dispatcher

3. What are the physical locations of the terminals? Directly across hall from dispatch room

4. If the terminal position is not equipped for radio operation how does the ratio dispatcher send information requests to the terminal operator and get back the required information? Walks across the hall and does it herself.

o Resource Control Data

1. If each terminal is not at a dispatcher location, is the terminal location equipped with a control unit so that the terminal operator can communicate with field forces? Yes [ ] No [X] Has a telephone in the teletype room.

2. If no, how is the information transfered to the field forces?

Walks across hall to dispatch rooms.

o Terminal Volume Data

1. For each data file what was the volume of information requests, entered messages, cancelled messages during ~~past year~~ 4 months? (Enter below.)

Computer System	Number of Information Requests	Number of Messages Entered	Number of Messages Cancelled	Number of Miscellaneous Uses (specify what)
NCIC		6	2	

2. Other data: _____

_____

CDS

FORM 10N

MAINTENANCE SYSTEM DATA

o Maintenance Service

Does agency have own maintenance service organization? [X] Yes [ ] No

o Self-Servicing Agency

1. Number of technicians _____

2. Location of service facility(s) _____

3. Are there any current plans for service-shop changes? Will renew and clarify yearly contract with Beaverhead Electronics in hopes of speeding up the repair process.

4. Other data: _____

o Contract or Other Service

1. Who is the servicing agency (company, other agency, etc.)? Beaverhead Electronics

2. Where are they located? 365 No. Parkview
Dillon, Mt.

3. Number of technicians? 1 part-time

4. Must mobiles go to shop for service? [X] Yes [X] No

5. Other data: Depends on type of repairs

6. Average length of stay in shop? Variable

7. Yearly expenditure on maintenance? Contract: $6500 FY80-81

8. Design system recommendations: The department would like to incorporate highband with lowband radios so that they have crosspatch possibilities.

(All information here recorded from interview with Sheriff, unless otherwise noted.) FORM 11N

PROBLEM REVIEW AND SUMMARY

o Potential Problem Areas

1. Coordination and interface with others Officials & employees of Beaverhead County & the City of Dillon indicated that interagency support & cooperation was totally satisfactory. The degree of coordination was commented upon favorably time & again, and seems commendable.

2. Preparedness for Emergencies (record on reverse side).

A • What can cause a major element of the system to fail?
Power failure by Rural Electric Association.

B • How likely is each possible cause of failure?
Not very likely. Once in past 5 years.

C • Is it likely that an element and its back-up will fail at the same time, for the same reason? No. The backup is a 30 gal. gas powered generator. A 100 gal. tank has been ordered.

D • Is the cause that produces a failure likely to create also an unusually heavy demand for services? No.

E • Can the primary back-up provide an adequate level of service in most situations? Always

F • If the primary back-up fails, will the secondary back-up (if there is one) be able to maintain an adequate level of service? No. secondary

G • How quickly can the back-up facility be put into operation?
In the time it takes to walk outside and start the generator (about 5-7 minutes).

H • Is maintenance service provided on a 24-hour per day, 7-day per week basis to ensure continuous system operation?
Yes. The generator is also tested once each week and run for ½ hr. to ensure proper operation.

J • Are communication equipment and personnel well protected against damage and interference with their duties? Yes. They are behind a locked door. Plans are to install an intercom between the dispatch room & the walkin lobby for greater efficiency.

3. Radio Coverage and Interference

K • Traffic (radio) density Approximately 20 different users of HB (information from H. Lake, Beaverhead Electronics)

L • Interference (co-channel, adjacent channel, intermodulation, . . .) Skip!!! For all LB users, especially in summer, and during daylight hours. Beaverhead County has "dead" areas in NW &NI (Wise River & Big Hole) section of county. They must call Anaconda or Phillipsburg dispatcher, who relays to Dillon.
A repeater system for that area will be proposed by the Sheriff at some future time.

4. Control Center Facilities _____

5. Telephone

   N • Trunk line _____

   P • Control pair _____

   Q • Switching _____

   R • Other _____

6. Maintenance Support

   S • Telephone Mountain Bell

   T • Land/Mobile Beaverhead Electronics

   W • Other Companies in Butte or Bozeman can be called in.

7. Cost of Present Operations $67,592.76 FY80-81

8. F.C.C. Compliance No problems

o Other Issues

1. New Technology If state goes to HB for law enforcement personnel, Beaverhead County will support it.

2. Frequency Spectrum Availability _____

3. Projected Expenditures No significant changes expected

4. National Telecommunication Policy No comment

5. Legal and Other External Constraints Awaiting decision of legislature concerning the sharing of equipment & manpower with the Montana Forest Service. Currently an unofficial verbal agreement exists.

6. Funding Constraints All officials interviewed indicated satisfaction with the present system and were able to perform their duties with existing

II. B. COMMISSIONER BOB MILLER

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency Beaverhead County Commission

Agency function (i.e. law enforcement, . . .) Executive Branch of County Government

Address Beaverhead County Courthouse/Dillon, Mt. 59725

Telephone 683-5425

Manager/Communications N/A

Communications Engineer/Planner/Technician Harvey Lake of Beaverhead Electronics - unofficial

Other key personnel:

There are three county commissioners

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [X] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch. Entire County, p. 6.

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

- Governmental Entity Organization Structure (Form 1N)
- Agency/Department Management Structure (Form 2N)
- Special Interagency Relationships (Form 3N)

  NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

   NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

   - Who are the primary and secondary clients of the defined system? Residents of Beaverhead County

   - What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? Montana Codes

     Yes

   - How is the quality of service measured to insure compliance with legal mandate? Elected officials have no official measurement.

   - Is an annual report available for the department or agency?

     [X] Yes [ ] No

     Lee Tuoft - Planner - 683-4862

Form 1N

BEAVERHEAD COUNTY
GOVERNMENT ENTITY ORGANIZATION STRUCTURE

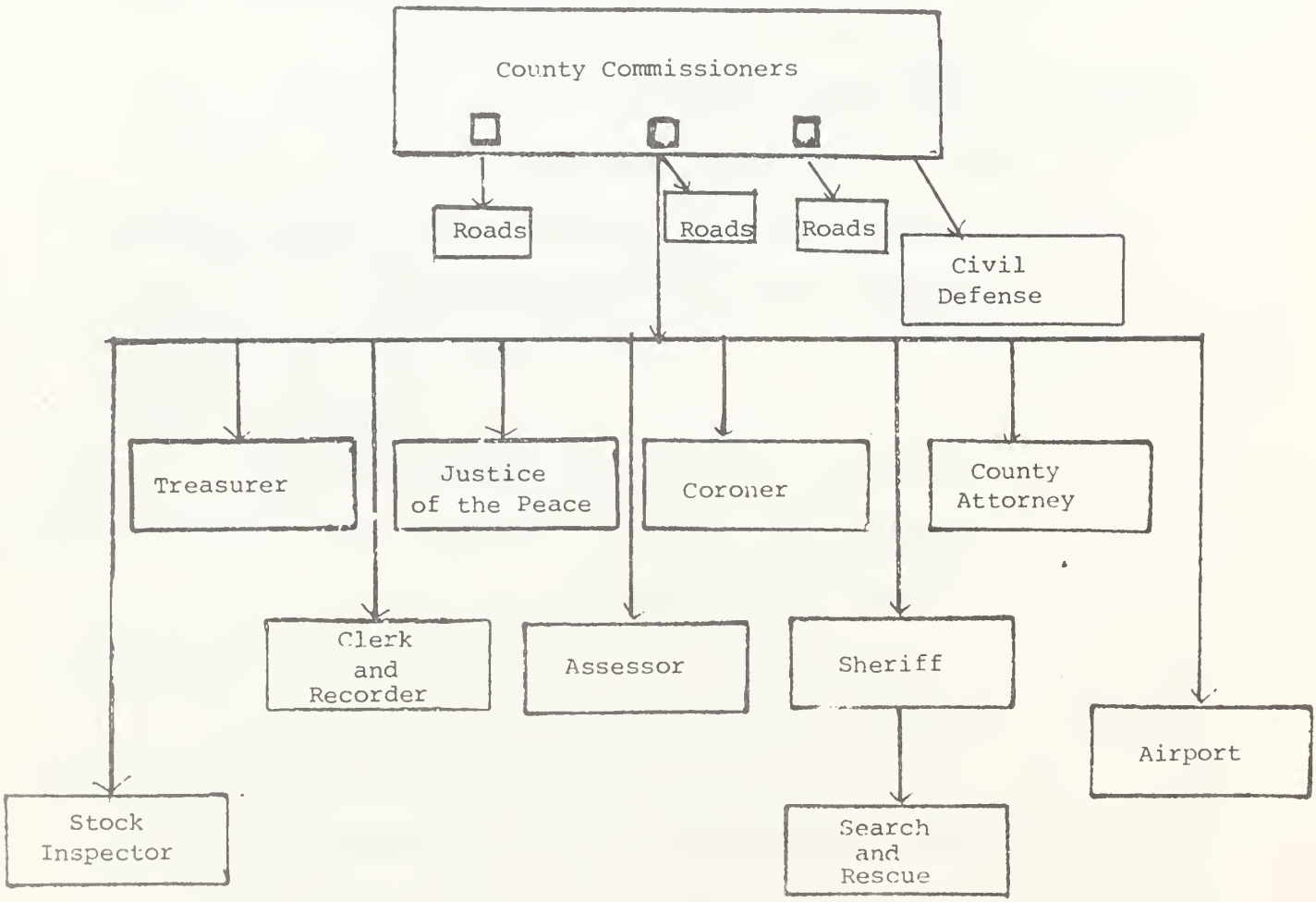


Chart designed from information available in Montana Codes Annotated 1979

FORM 4N

SYSTEM DEMOGRAPHIC DATA

In order to effectively develop a system which will serve not only the needs of today but also the needs of the future it is necessary to have a good estimate of the environment in which the agency will operate for the next 5-10 years. Below are listed some categories of change which are important. Please comment on them.

o Population Trends

Steady-increase-decrease? How much? Shifts within area? Slight, steady decrease. 1970-80 the county lost 500 residents. Shift (increase) in population density surrounding Dillon.

o Area Growth

Will present political boundaries change to include more area? Which way will they go? (Include "future" map, if possible.) No expected changes.

o Tax Bases & Budgets

1. What significant changes might occur in the tax base? The tax base has been increasing slowly due to new construction

2. Will operating budgets be affected? How? If Class 6 of the cattle tax is eliminated by the 1981 Montana legislature, the county will lose approximately $1 million, which is one-half of their operating budget.

o Economic Class Proportions of Population

As population grows will low - middle - high income groups change in terms of % of total population?

If so, how? If the petroleum, and/or the iron ore discoveries are developed, the medium income tax base will probably increase.

o Political Trends

Will form of government change? No changes foreseen

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency Beaverhead County Sheriff's Department

Agency function (i.e. law enforcement, . . .) law enforcement

Address Box 109, Dillon, Mt. 59725

Telephone 406-683-2383

Manager/Communications None

Unofficial Communications Engineer/Planner/Technician Harvey Lake of Beaverhead Electronics

Other key personnel:

Undersheriff Mark Doering

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [x] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch, Beaverhead County, p. 6.

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

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NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

- Who are the primary and secondary clients of the defined system? Residents of Beaverhead County

- What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? Montana Codes Annotated 1979

  Clearly defined County wide system

- How is the quality of service measured to insure compliance with legal mandate? No official measure. FBI or Attorney General can be called in specific complaint cases.

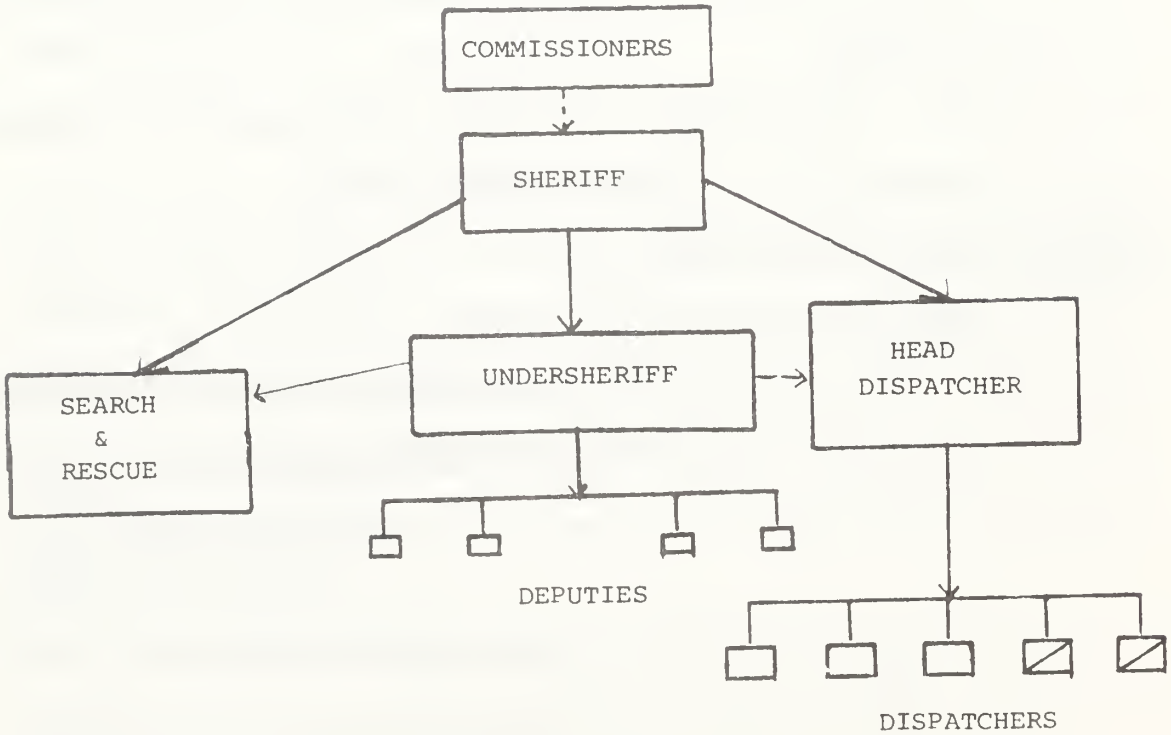
- Is an annual report available for the department or agency?

  [x] Yes [ ] No Monthly and quarterly reports

- Does the department or agency have a designated communication center in the defined area for receipt of complaints and dispatch or coordination of resources?

Form 2N

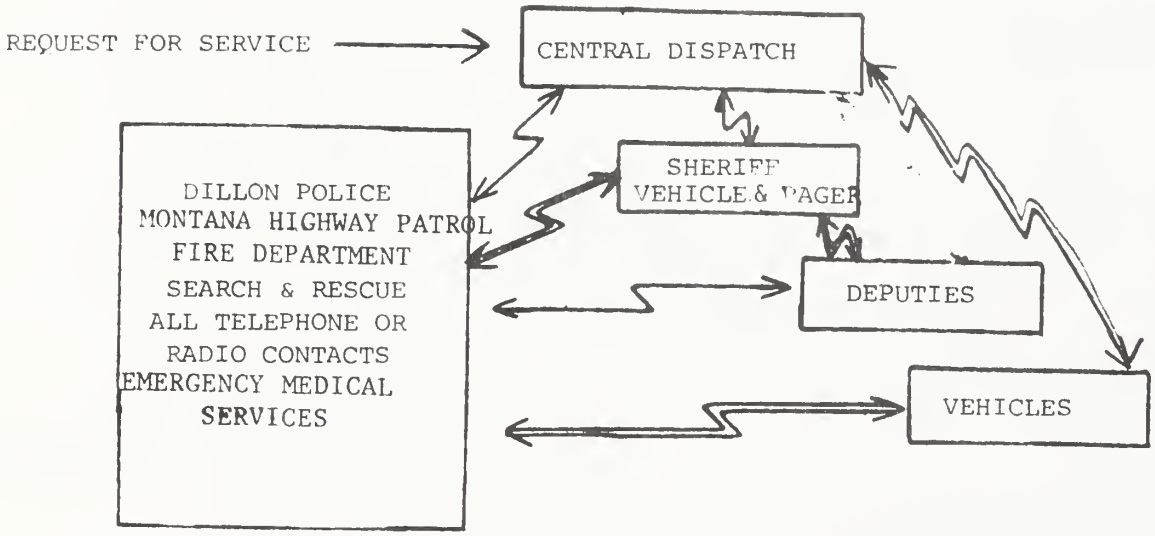
BEAVERHEAD COUNTY SHERIFF
ORGANIZATIONAL STRUCTURE

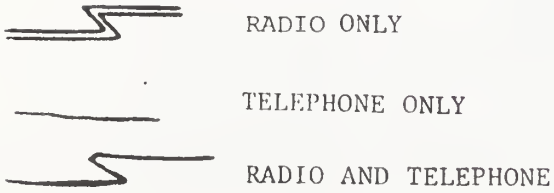


Full-time

Part-time

BEAVERHEAD COUNTY SHERIFF'S DEPARTMENT
COMMUNICATION SYSTEM





What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages Sept-Dec 1980 4 months	Total Number of Messages During Monitored Busy Period	Average Radio System Delay During Busy Period (seconds)
KXK 427	374	15	
WAH 92	9	Length of Busy Period (hours) 5 hrs/day Time and Date of Monitoring 8/25-9/7/80 9 PM-2 AM	
KLV 872	6		

What is the volume of work calls? (Enter below)

Telephone Number	Total Number of Calls Sept-Dec 1980		Total Number of Calls During Monitored Busy Period	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
	251	907		
	Length of Busy Period (hrs) 5 hrs/day Time and Date of Monitoring 8/25-9/7/80			

What percent of your service/complaint requests are received via:

Telephone	64%	(1158)
Radio	21%	(389)
Walk-in	15%	(268)
		(1815)

Terminal Volume Data

For each data file what was the volume of information requests, entered messages, cancelled messages during past year? (Enter below)

Computer System	Number of Information Requests	Number of Messages Entered	Number of Messages Cancelled	Number of Miscellaneous Uses (specify what)

(see Appendix E E-6)

II. D. COMMANDER MIKE SHAFER

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency SEARCH & RESCUE (Volunteer)

Agency function (i.e. law enforcement

To aid law enforcement & emergency aid agencies in search & rescue operations if authorized by sheriff.

Address Mike Shafer/229 W. Morse/Dillon, Mt.59725

Telephone 683-5384 (home) 683-2383 (sheriff)

Manager/Communications Harvey Lake

Unofficial Communications Engineer/Planner/Technician H. Lake of Beaverhead Electronics

Other key personnel:

Sheriff R. Later

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [X] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch. Beaverhead County, p. 6.

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

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- Agency/Department Management Structure (Form 2N)
- Special Interagency Relationships (Form 3N)

  NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

   NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

   - Who are the primary and secondary clients of the defined system? N/A

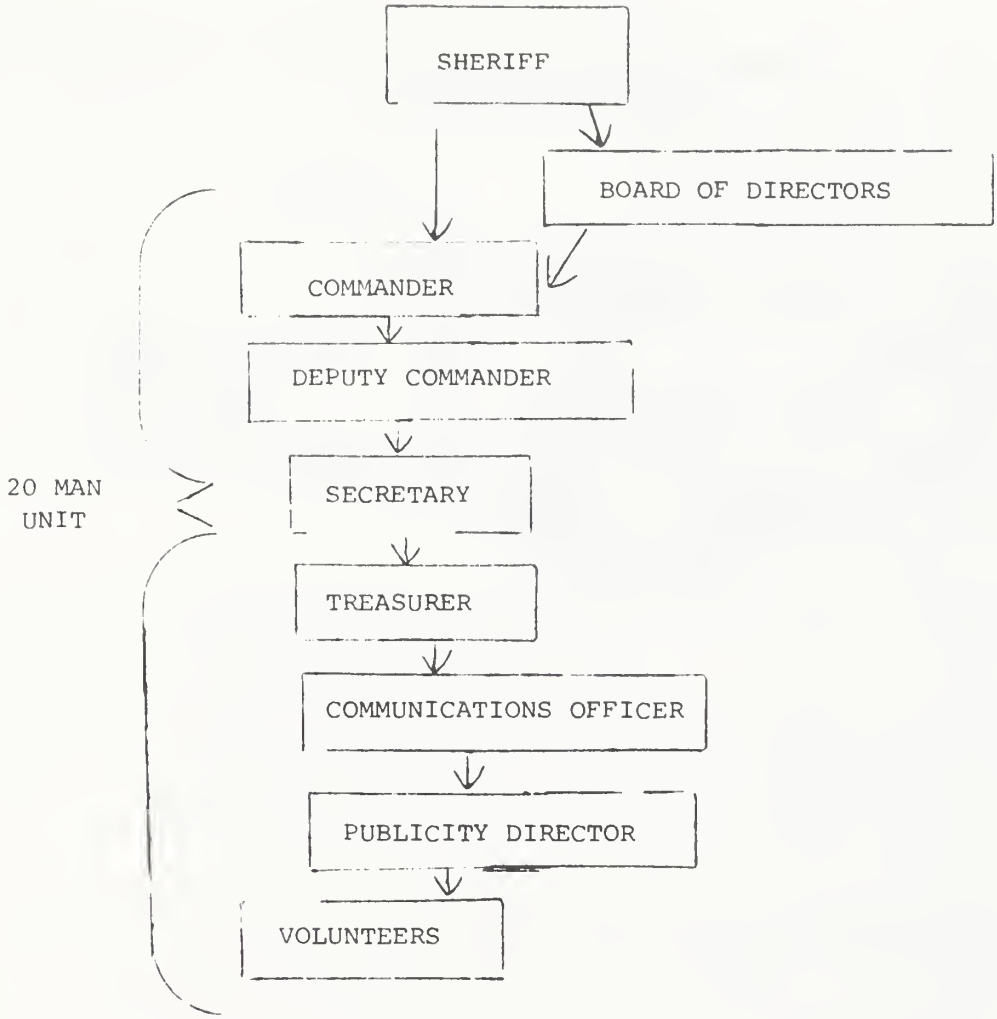
   - What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? N/A

   - How is the quality of service measured to insure compliance with legal mandate? Unit is under direct supervision of Sheriff

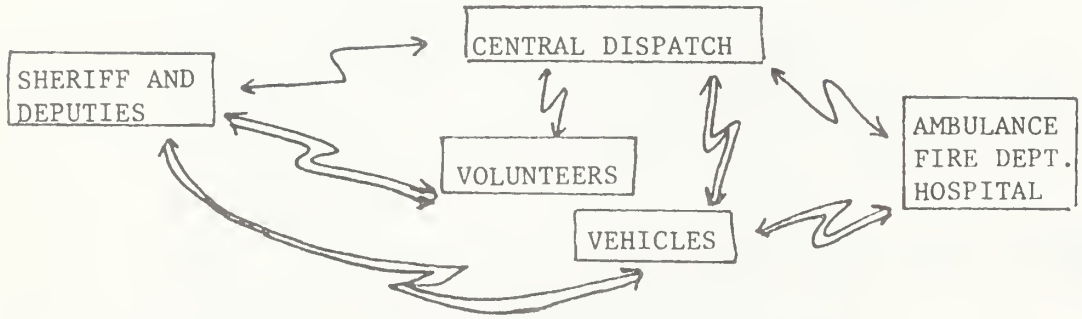
   - Is an annual report available for the department or agency?

     [ ] Yes [x] No

BEAVERHEAD COUNTY SEARCH AND RESCUE
ORGANIZATIONAL STRUCTURE



BEAVERHEAD COUNTY SEARCH AND RESCUE
COMMUNICATION SYSTEM



RADIO ONLY

TELEPHONE ONLY

RADIO AND TELEPHONE

What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages SEPT-DEC 1980	Total Number of Messages During Monitored Busy Period	Average Radio System Delay During Busy Period (seconds)
KLV 872	2		
WCU 966	1		
		Length of Busy Period (hours)	
		Time and Date of Monitoring	

What is the volume of phone calls? (Enter below)

Telephone Number	Total Number of Calls SEPT - DEC 1980		Total Number of Calls During Monitored Busy Period	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
	0	0		
		Length of Busy Period (Hours)		
		Time and Date of Monitoring		

What percent of your service/complaint requests are received via:

Telephone	0	(0)
Radio	100%	(3)
Walk-in	0	(0)

The department has 11 land/mobile radio units. Eight were bought with Beaverhead County Revenue Sharing monies.

The department pays $18.00 yearly for its percentile usage of the repeater station. Two portable radios (5-watt Portacoms) are tied to the repeater system.

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency Emergency Medical Services (EMS)

Agency function (i.e. law enforcement, . . .) To provide emergency medical services

Address Gale Murray, President, Beaverhead EMS Corp.; P.O. Box 1106 Dillon, Mt. 59725

Telephone 683-2333

Manager/Communications

Unofficial Communications Engineer/Planner/Technician Keith Reeder

Other key personnel:

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [X] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch. No map available from E.M.S.

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

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- Special Interagency Relationships (Form 3N)

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2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

   NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

   - Who are the primary and secondary clients of the defined system? Persons requiring emergency medical services who request EMS help.

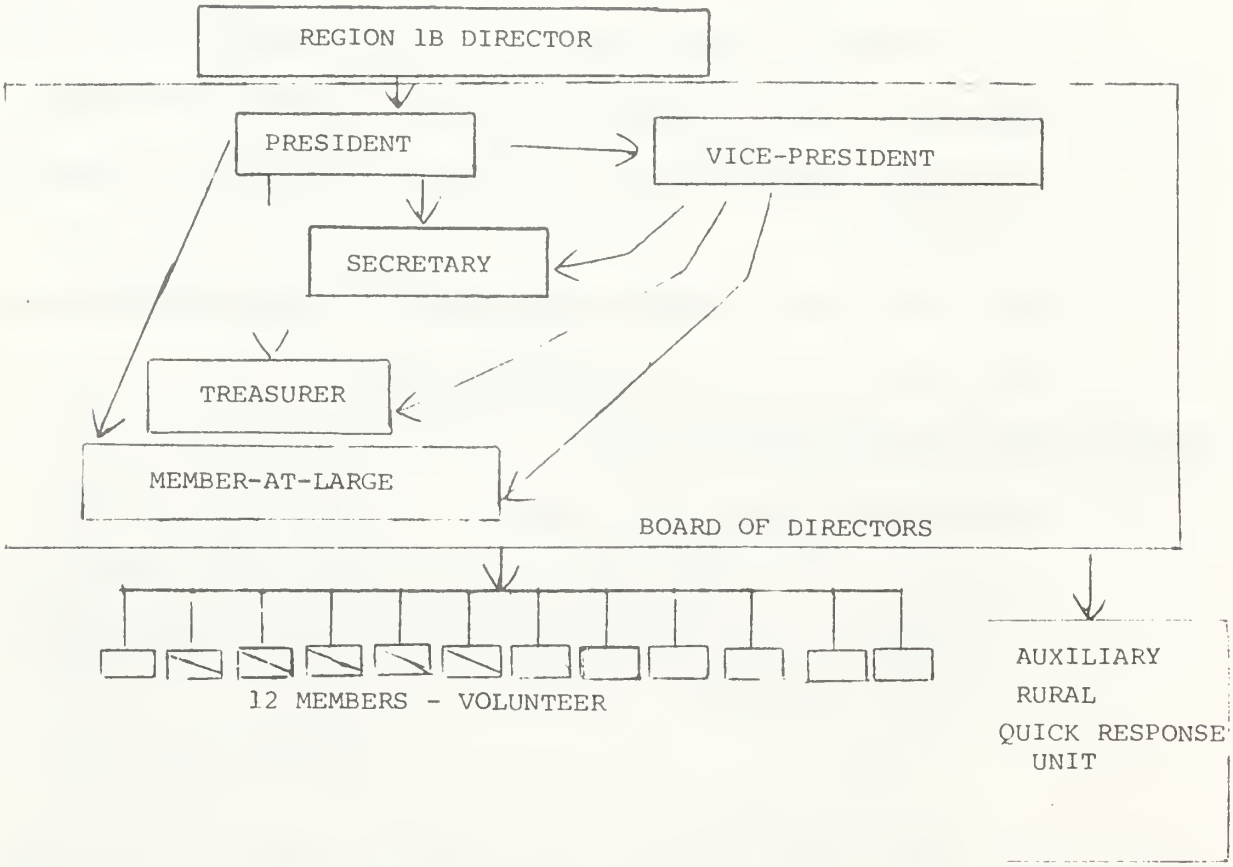
   - What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? Emergency Medical Services Systems
     U.S. Dept. Health, Education & Welfare.
     Mutual aid agreements with Lima/Wisdom Unit-Ruby Valley Unit (Madison Val
     No clearly defined geographical jurisdiction available.

   - How is the quality of service measured to insure compliance with legal mandate? Regional Director

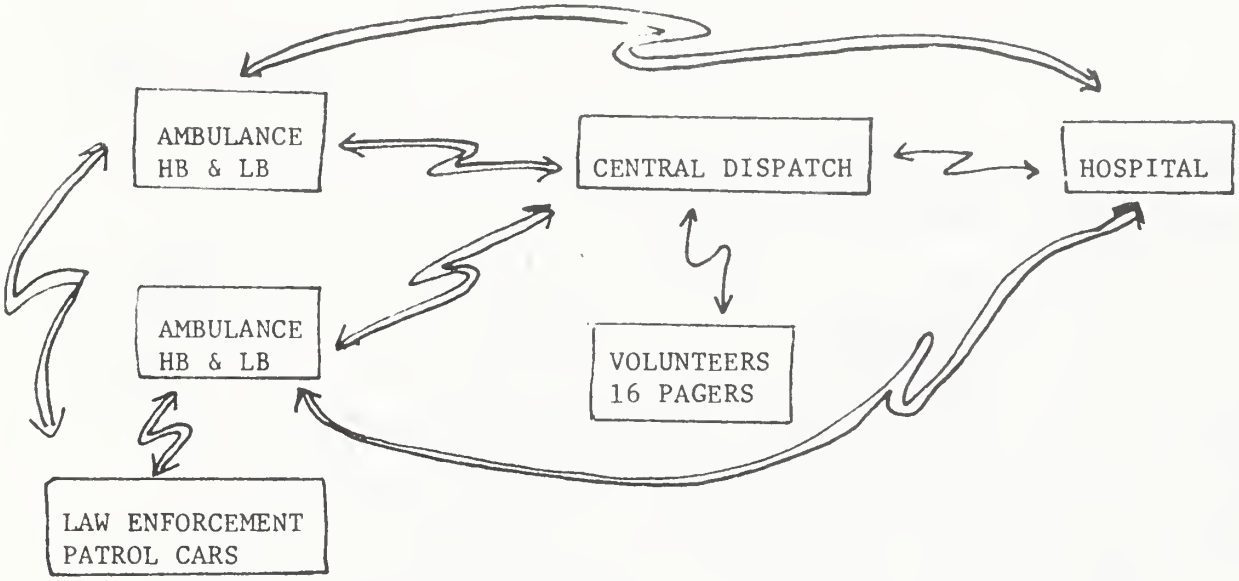
   - Is an annual report available for the department or agency?

     ☐ Yes ☐ No N/A

BEAVERHEAD COUNTY EMERGENCY MEDICAL SERVICES
ORGANIZATIONAL STRUCTURE



BEAVERHEAD COUNTY EMERGENCY MEDICAL SERVICES
COMMUNICATION SYSTEM



RADIO ONLY

TELEPHONE ONLY

RADIO AND TELEPHONE

What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages SEPT-DEC 1980	Total Number of Messages During Monitored Busy Period	Average Radio System Delay During Busy Period (seconds)
KLV 872	54		
WCU 966	17		

What is the volume of phone calls? (Enter below)

Telephone Number	Total Number of Calls SEPT -DEC 1980		Total Number of Calls During Monitored Busy Period	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
	58	0		
Length of Busy Period (Hours)				
Time and Date of Monitoring				

What percent of your service/complaint requests are received via:

Telephone 44% (58)

Radio 54% (71)

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency Volunteer Fire Department

Agency function (i.e. law enforcement, . . .) fight fires

Address Mike Swetish, Fire Chief
528 E. Poindexter, Dillon, Mt. 59725

Telephone 683-2311

Manager/Communications

Unofficial Communications Engineer/Planner/Technician H. Lake of Beaverhead Electronics

Other key personnel:

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [X] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch.

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

- Governmental Entity Organization Structure (Form 1N)
- Agency/Department Management Structure (Form 2N)
- Special Interagency Relationships (Form 3N)

  NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

   NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

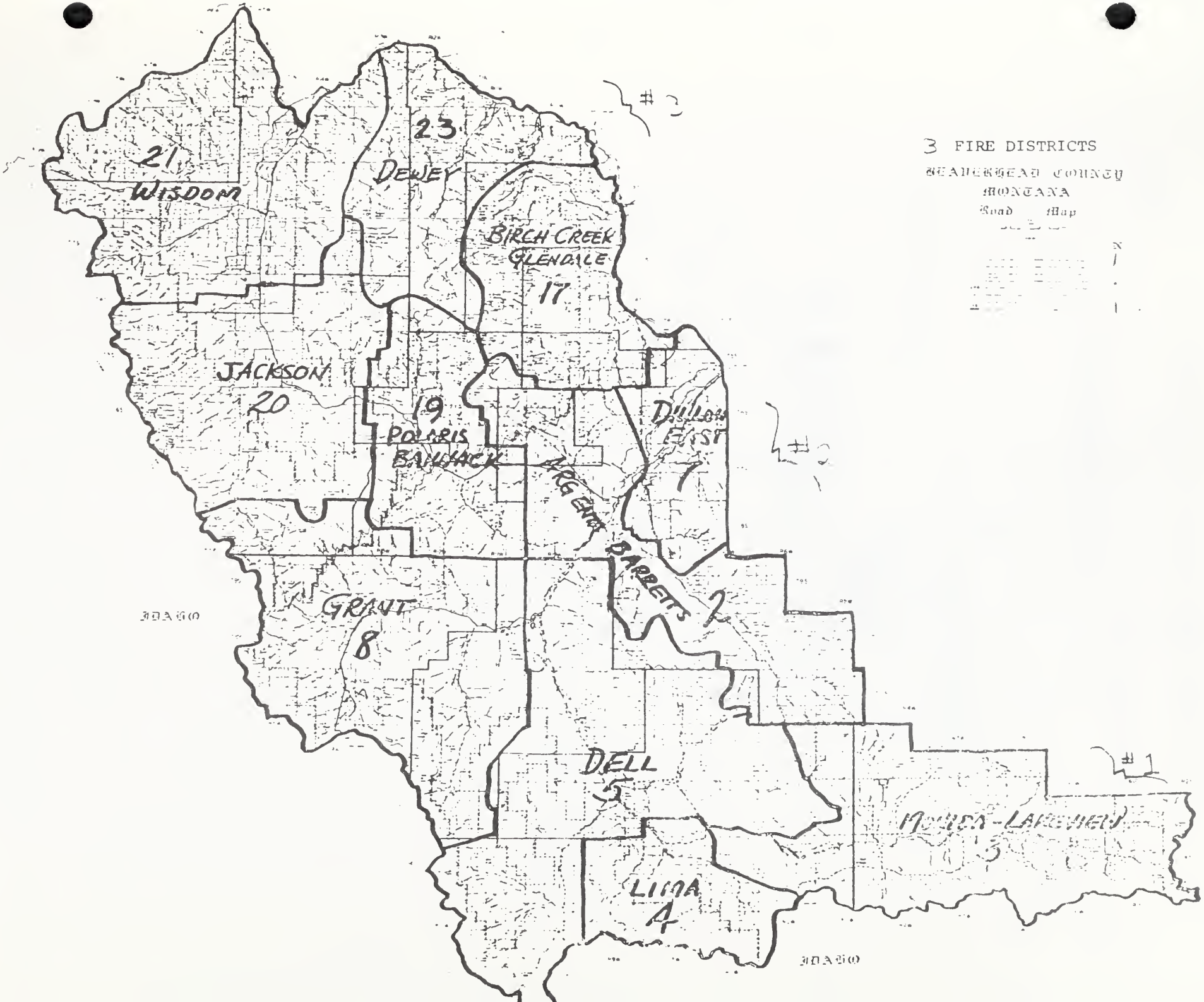
   - Who are the primary and secondary clients of the defined system? Residents of Beaverhead County fire districts

   - What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? Montana Codes Annotated 1979

   - How is the quality of service measured to insure compliance with legal mandate? Monthly reports to State Fire Marshall

   - Is an annual report available for the department or agency?

     [X] Yes [ ] No Monthly

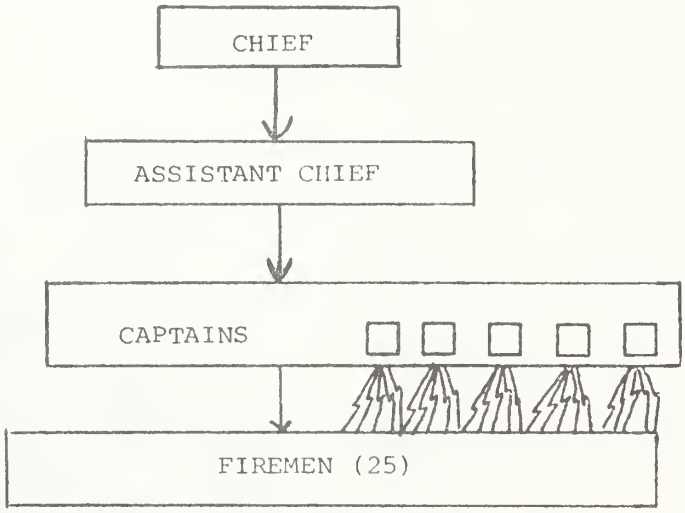

3 FIRE DISTRICTS
BEAVERHEAD COUNTY
MONTANA
Road Map
21
WISDOM
23
DEWEY
BIRCH CREEK
GLENDALE
17
JACKSON
20
19
POLARIS
BANNACK
ARGENTA
BARRETTS
2
DILLON
EAST
7
GRANT
8
DELL
5
LIMA
4
MONIDA-LAKEVIEW
3
#1
#2
#3
IDAHO
IDAHO

BEAVERHEAD COUNTY VOLUNTEER FIRE DEPARTMENT #2
ORGANIZATIONAL STRUCTURE

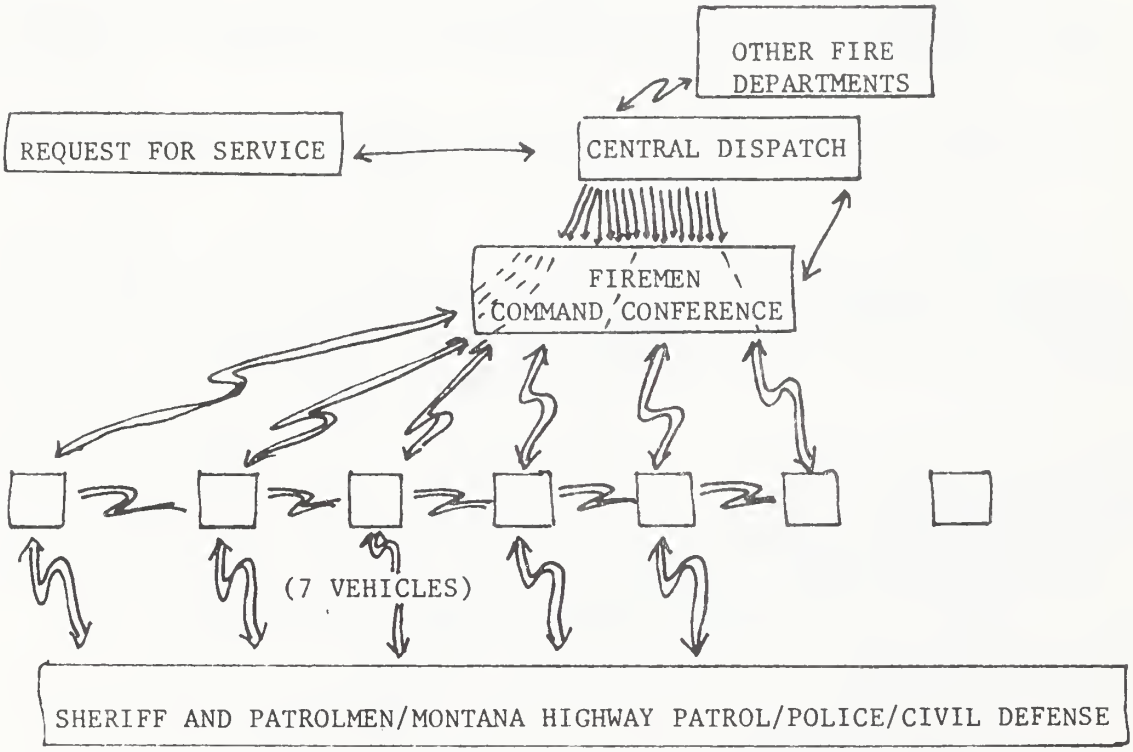
FORM 2N

3 BEAVERHEAD COUNTY UNITS #1 LIMA
#2 DILLON
#3 JACKSON/WISDOM

#2 District:



BEAVERHEAD COUNTY VOLUNTEER FIRE DEPARTMENT
COMMUNICATION SYSTEM



FIRE DEPARTMENT

What is the volume of phone calls? (Enter below)

Telephone Number	Total Number of Calls SEPT-DEC 1980		Total Number of Calls During Monitored Busy Period	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
	30	0		

Length of Busy Period (Hours) _____

Time and Date of Monitoring _____

What percent of your service/complaint requests are received via:

Telephone 88% (30)

Radio 0 (0)

Walk-in 12% (4)

(34)

FORM 11N

VOLUNTEER FIRE DEPARTMENT DISTRICT #2
PROBLEM REVIEW AND SUMMARY

0 Potential Problem Areas

1. Coordination and interface with others: There are three (3) clear fire district boundaries in Beaverhead County, but in actuality some overlap occurs because of factors such as terrain, proximity & equipment.

   DISTRICT #2 occasionally answers calls from neighboring Madison County residents.

   Cooperation and coordination with other agencies is very satisfactory and done verbally on an informal basis.

2. Preparedness for Emergencies:

   All firemen are on the Command Conference telephone system. Were this to fail each fireman would have to be called individually, thus taking much more time and tying up dispatches. Thus far this has never happened.

3. Radio Coverage and Interference

   District #2 has seven (7) trucks available. Five of these are equipped with both highband and lowband radios. Two have only lowband and await installation of (available) highband equipment. They can communicate with nearly everyone in the county directly from the vehicles.

   As always, skip is a big problem with lowband.

4. Cost of Present Operations:

   City pays half and fire district mil + ½ levy pays half = $60 month

CHIEF SWETISH FINDS THE CURRENT COMMUNICATIONS SYSTEM VERY SATISFACTORY. THEY HAVE NO PLANS OR RECOMMENDATIONS FOR CHANGES.

II. G. ROGER JOHNSON, DIRECTOR

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency Civil Defense

Agency function (i.e. law enforcement, . . .) To aid in the coordination of county efforts in case of civil defense emergency situations.

Address Beaverhead County Courthouse; Dillon, Mt. 59725

Telephone 683-5321

Manager/Communications N/A

Unofficial Communications Engineer/Planner/Technician H. Lake of Beaverhead Electronics

Other key personnel:

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [X] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch. Beaverhead County, p. 6.

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

- Governmental Entity Organization Structure (Form 1N)
- Agency/Department Management Structure (Form 2N)
- Special Interagency Relationships (Form 3N)

  NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

   NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

   - Who are the primary and secondary clients of the defined system? (1) Residents of Beaverhead County (2) Adjacent county residents.

   - What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? Montana Codes Annotated 1979

     Yes

   - How is the quality of service measured to insure compliance with legal mandate? District Director

   - Is an annual report available for the department or agency?

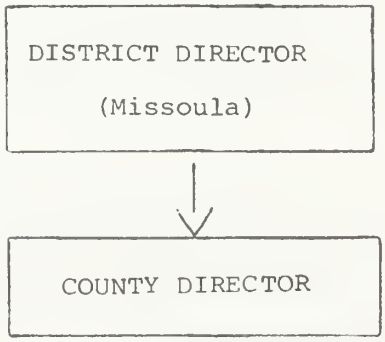
     [X] Yes [ ] No

     Monthly

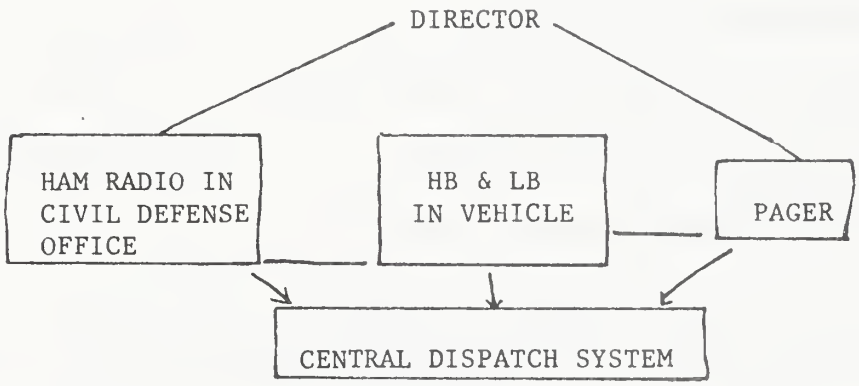
Monthly report to: District Director Bill Thomas
Box 9111
Missoula, MT 59801
phone: 406-243-4152

FORM 2N

BEAVERHEAD COUNTY CIVIL DEFENSE
ORGANIZATIONAL STRUCTURE



BEAVERHEAD COUNTY CIVIL DEFENSE
COMMUNICATION SYSTEM



Communicates through Central Dispatch with: Helena offices/Hospital/ Mayor/County Commissioner/Sheriff/Search and Rescue/Fire/Ambulance/ Ham Operators/Lima Dam Supervisor/Rest Homes/Police/Montana Highway Patrol/ Emergency Medical Services

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency Mayor of Dillon

Agency function (i.e. law enforcement, . . .) Executive Branch of city government

Address 125 No. Idaho Dillon, Mt. 59725

Telephone 683-4245

Manager/Communications None

Communications Engineer/Planner/Technician None

Other key personnel:

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [x] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch. City of Dillon

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

- Governmental Entity Organization Structure (Form 1N)
- Agency/Department Management Structure (Form 2N)
- Special Interagency Relationships (Form 3N)

  NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

   NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

   - Who are the primary and secondary clients of the defined system? Residents of the city of Dillon

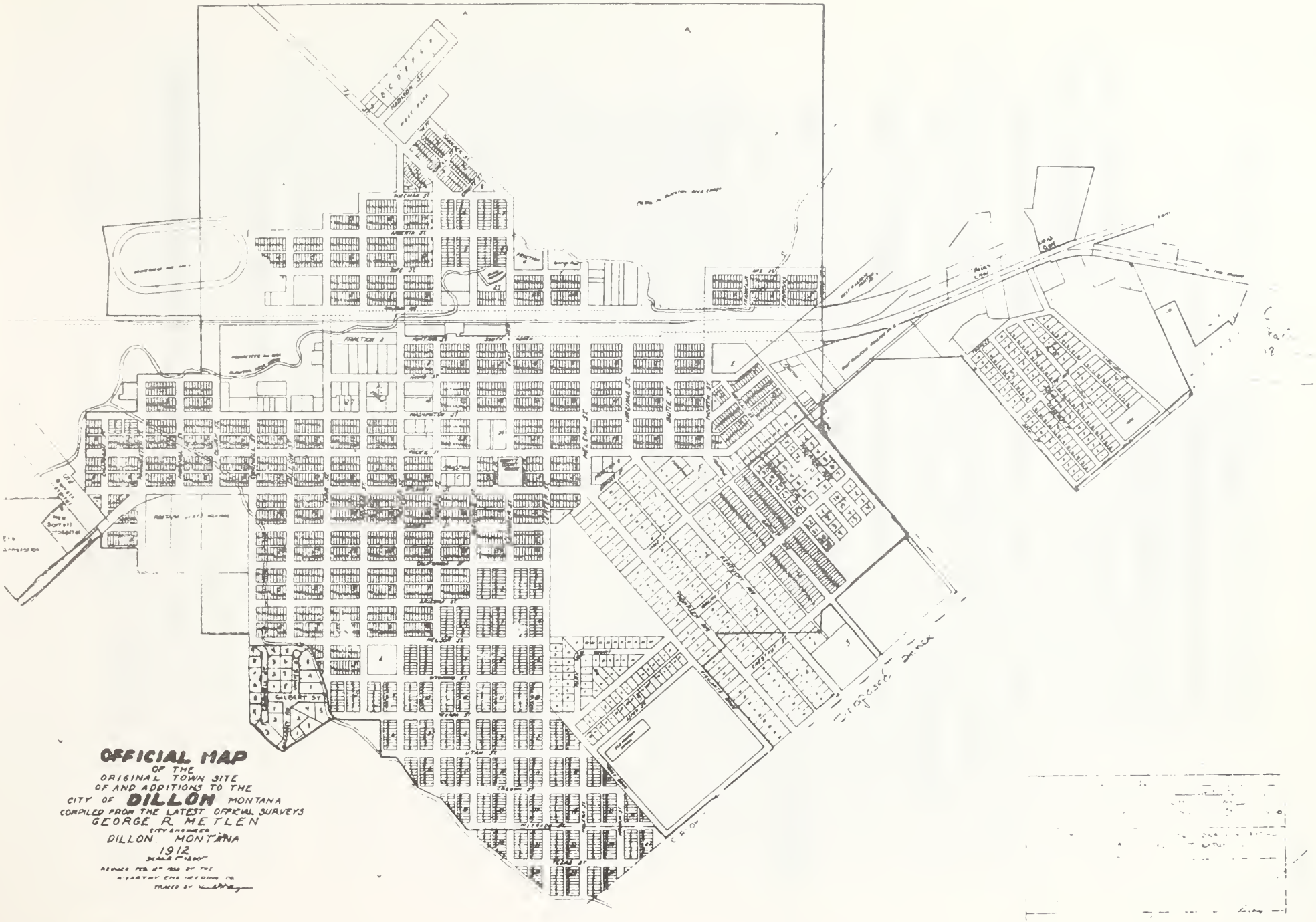
   - What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? City Charter and Montana Codes

     Yes

   - How is the quality of service measured to insure compliance with legal mandate? Elected official - no measurement other than elections.

   - Is an annual report available for the department or agency?

     [X] Yes [ ] No


OFFICIAL MAP
OF THE
ORIGINAL TOWN SITE
OF AND ADDITIONS TO THE
CITY OF DILLON MONTANA
COMPILED FROM THE LATEST OFFICIAL SURVEYS
GEORGE R. METLEN
CITY ENGINEER
DILLON, MONTANA
1912
HELENA ST
VIRGINIA ST
BUTTE ST
NORTH ST
GILBERT ST
NELSON ST
UTAH ST
CREEK ST
TEXAS ST
FRACTION A
New Bartell Hospital

Form 1N

CITY OF DILLON

GOVERNMENTAL ENTITY ORGANIZATION STRUCTURE

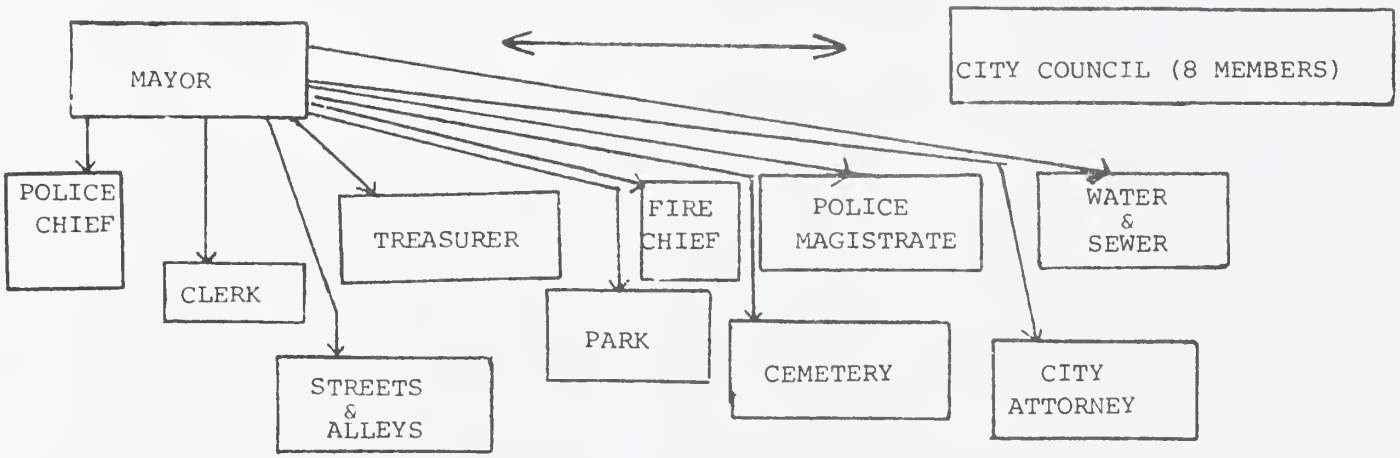
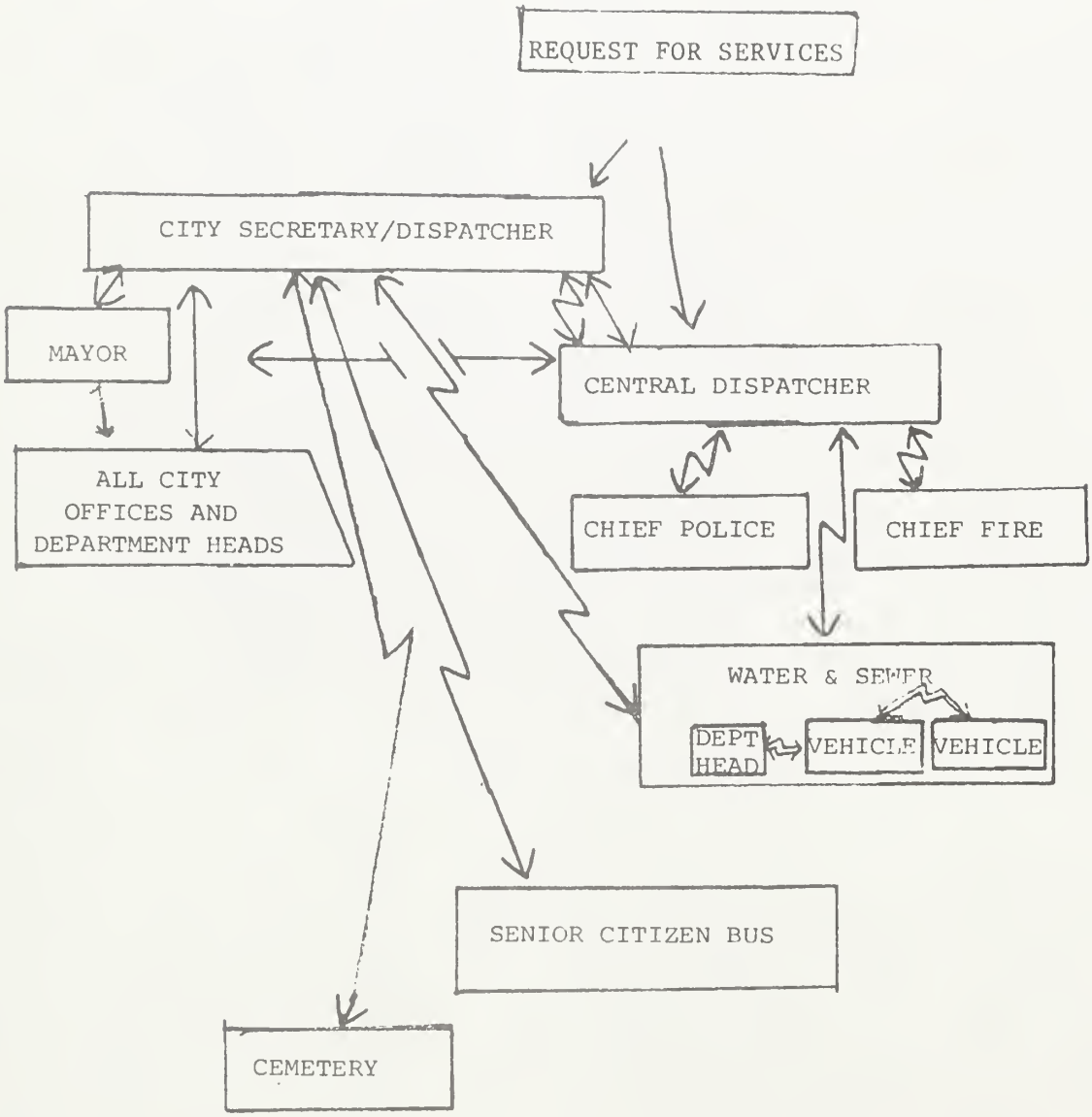


Chart designed from information available in Montana Codes Annotated 1979.

MAYOR/CITY OFFICES
COMMUNICATION SYSTEM



RADIO ONLY

TELEPHONE ONLY

RADIO AND TELEPHONE

FORM 4N

SYSTEM DEMOGRAPHIC DATA

In order to effectively develop a system which will serve not only the needs of today but also the needs of the future it is necessary to have a good estimate of the environment in which the agency will operate for the next 5-10 years. Below are listed some categories of change which are important. Please comment on them.

o Population Trends

Steady-increase-decrease? How much? Shifts within area? Expect a small growth due to stable economic base (agriculture). Slight trend to moving outside city limits.

o Area Growth

Will present political boundaries change to include more area? Which way will they go? (Include "future" map, if possible.) Plans and proposals include annexing the Thompson-Barnett area; the Erb area.

o Tax Bases & Budgets

1. What significant changes might occur in the tax base? Slight increase due to annexations, especially if a shopping center is built.

2. Will operating budgets be affected? How? Currently taxing at maximum mill levy and are in good financial condition

o Economic Class Proportions of Population

As population grows will low - middle - high income groups change in terms of % of total population? Very little

If so, how? Perhaps more middle income groups due to workers from oil and iron ore exploration and speculations

o Political Trends

Will form of government change? No foreseeable changes

FORM 6N

TELEPHONE ACCESS SYSTEM DATA

o Name of telephone service provider (i.e., common carrier - Bell, GTE, . . .)

Mountain Bell

o Does department have separate emergency and administrative phone numbers?

[ ] Yes [X] No

1. If no, how many incoming lines are there? Four (4)
2. If yes, how many incoming lines are there for: Emergency _____

   Administration _____
3. Does the department utilize 911? ___ Yes X No

   If yes, explain: _____
4. How many unlisted number lines does the department have for its own business? None
5. Are telephone lines recorded? Yes [ ] No [X]

o What is the volume of phone calls? (Enter below.) No records kept

Telephone Number	Total Number of Calls Past Year		Total Number of Calls During Monitored Period 8 a.m.-5 p.m. Mon-Fri	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
T. 1	No record		214	131
T. 2	No idea		0	5

Length of Busy Period (Hours) 9 hrs./day

Time and Date of Monitoring 2/26/81-3/10/81

NOTE: See Appendices I, II, and III if telephone volume data is not available and must be collected.

FORM 6N (Continued)

o What percent of the time are all lines busy? (If possible, obtain from telephone company percent of calls which received a busy signal.) No Record. Clerk says they have never been all busy at one time.

o What are the costs? (Enter below.)

No record

Type of Line	Installation	Monthly
Emergency		
Administrative		

o Is there any backup telephone equipment? Yes [ ] No [X]

If yes, describe backup. _____

o Do the operators handle tephone calls for other services (e.g., fire, public works)? Yes [X] No [ ]

If yes, which services? Employees of City of Dillon: Mayor; Engineer; Water and Sewer Dept.; Senior Citizen Bus; Streets and alleys; Clerk; cemetery; parks; Treasurer; City Council; (non-emergency personnel).

FORM 7N

SERVICE/COMPLAINT SYSTEM DATA

0 User Access

1. In the department, who answers initial service complaint calls (i.e., secretary, clerk, switchboard operator, dispatcher, . . .)?
   Secretary/clerk

2. What percent are received via telephone 95%, radio _____, and walk-in 5%? (purely guesswork: no records are kept)

3. Number of complaint positions (total). One (1)

4. What is the position-manning schedule? 8AM - 5PM M thru F

5. Describe capabilities provided at each position?
   - Position No. 1 _____
   - Position No. 2 _____

6. Does the complaint taker maintain some type of status system (i.e., board, file, . . .)? ___ Yes X No Explain: _____

7. What special emergency procedures are set-up for the service/complaint room? Mayor is located in adjoining office

8. Describe any other activity in the service/complaint room besides the taking of service requests or complaints. Secretarial, dispatch

9. How do messages get from the call taker to the dispatcher? _____
   Same person

FORM 8N

DISPATCH SYSTEM DATA

o Dispatch Facilities Data

1. Number and location of dispatcher positions? 2 dispatch positions

   1. City Offices 2. Central Dispatcher (see Central Dispatch System data)

2. What is the dispatch position manning schedule? 8AM - 5PM

   Monday thru Friday year round except legal holidays

3. Describe capabilities provided at each position.

   - Position No. 1 _____
   - Position No. 2 _____
   - Position No. 3 _____

4. Does the dispatcher have supervisory control over remote transmit locations? ☐ Yes ☐ No

5. Does the dispatcher switch these locations in and out, or are they connected at all times? _____

6. Are radio channels recorded? ☐ Yes ☒ No

o Resource Control Data

1. Who selects service response? Secretary/dispatcher
2. Who services or prepares complaint form? no forms used
3. Who marks service unit back in service? secretary/dispatcher

4. How many status levels (i.e., available, enroute, on assignment, out of service, . . .) are there for field personnel? None

5. What are they? _____ _____ _____

6. Are any levels of status of low priority so that a man assigned to a lower level complaint can be reassigned to a higher level complaint? Yes [x] No [ ]

7. Describe the status level priorities and who decides to reassign a man. Emergency level has high priority. Mayor or supervisor decides assignments.

8. Are there any priorities assigned to complaint assignments (e.g., immediate dispatch, delayed dispatch). Yes [ ] No [x]

9. If yes, describe the priorities and how the priority of a complaint is determined, and then communicated to service providers. Mayor or department supervisors determine assignments

o Dispatch Volume Data

1. What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages Past Year	Total Number of Messages During Monitored Period 8AM-5PM Mon-Fri	Average Radio System Delay During Busy Period (seconds)
1	No Record	7	No Record
2	" "	16	" "
4	" "	166	" "
		Length of Busy Period (hours) 9 hrs/wk day	
		Time and Date of Monitoring 2/26/81 - 3/11/81	

NOTE: See Appendices I, III, and IV if radio volume and message length data is not available.

2. What was the average message length N/A seconds?

3. Does the dispatcher handle radio messages for other services (e.g., fire, public works)? [X] Yes [ ] No

4. If yes, which services? Non-emergency city services

5. Other data: _____

What volume for:	personal uses?	N/A
" " "	repeats?	N/A
" " "	abuses?	N/A

FORM 10N

MAINTENANCE SYSTEM DATA

o Maintenance Service

Does agency have own maintenance service organization? [ ] Yes [X] No

o Self-Servicing Agency

1. Number of technicians _____

2. Location of service facility(s) _____

3. Are there any current plans for service-shop changes? _____

4. Other data: _____

o Contract or Other Service

1. Who is the servicing agency (company, other agency, etc.)? Beaverhead Electronics

2. Where are they located? 365 No. Parkview - Dillon, Mt.

3. Number of technicians? 2 available on part-time basis

4. Must mobiles go to shop for service? [ ] Yes [X] No Depends on service needed

5. Other data: Maintenance is done on a case by case basis.

6. Average length stay in shop? N/A

7. Yearly expenditure on maintenance? Including teletype - FY79-80 $684.00 - $2000.00 New purchases

8. Design system recommendation?
They would like more mobile radio units but are basically very satisfied with existing system.

POTENTIAL PROBLEM AREAS

Coordination and interface with others:

Montana Highway Patrol uses the City/County Central Dispatch System and should contribute financially to the system.

Everyday, non-emergency communications concerning city officials by-pass the Central Dispatch and go directly to the city secretary/clerk.

The city of Dillon and county of Beaverhead maintain verbal, informal agreements to share services when requested. This includes personnel and equipment. The overall concensus regarding this arrangement is that it is very satisfactory.

Preparedness for Emergencies:

See same under Sheriff - Beaverhead County.

F.C.C. Compliance:

No problems.

Cost of Present Operations:

City pays approximately $640 per year for teletype and communications equipment maintenance.

Cost of Central Dispatch system in FY80-81 is $67,592.76. The city pays for one-half (½) of this and the county pays one-half (½).

FY80-81 = $33,796.38

Projected Expenditures

No projected changes in expenditures

LAND/MOBILE
NEEDS ASSESSMENT METHODOLOGY:
PHASE II

o GENERAL INFORMATION

Agency DILLON POLICE DEPT.

Agency function (i.e. law enforcement, . . .) Law enforcement

Address Beaverhead County Courthouse, Dillon, Mt. 59725

Telephone 683-2333

Manager/Communications N/A

Unofficial Communications Engineer/Planner/Technician H. Lake of Beaverhead Electronics

Other key personnel:

o LAND/MOBILE SYSTEM IDENTIFICATION (P1.0)

1. Land/mobile physical inventory complete? [ ] Yes [X] No
2. If yes, review and attach.
3. If no, geographically define the system service area (i.e. city, county, district, . . .) and attach sketch. City of Dillon, p. 52

o ORGANIZATIONAL STRUCTURE AND DEMOGRAPHIC DATA (P2.0)

1. Organizational structure of the defined system (i.e. city, county, district, . . .) on the following forms:

- Governmental Entity Organization Structure (Form 1N)
- Agency/Department Management Structure (Form 2N)
- Special Interagency Relationships (Form 3N)

NOTE: When available, attach existing organizational charts, including any modification or planned changes.

2. Demographic data of the defined system. Review of this data is intended to include but not be limited by the questions set forth on Form 4N.

NOTE: State and local government profiles should be included as appropriate for trends and baseline data.

o COMMUNICATION SYSTEM FUNCTIONS (P3.0)

1. Communication needs to be served.

- Who are the primary and secondary clients of the defined system? Residents of and visitors to the city of Dillon

- What establishes the legal mandate to provide the service? Does it clearly define the client system and geographic jurisdiction? Montana Codes Annotated 1979

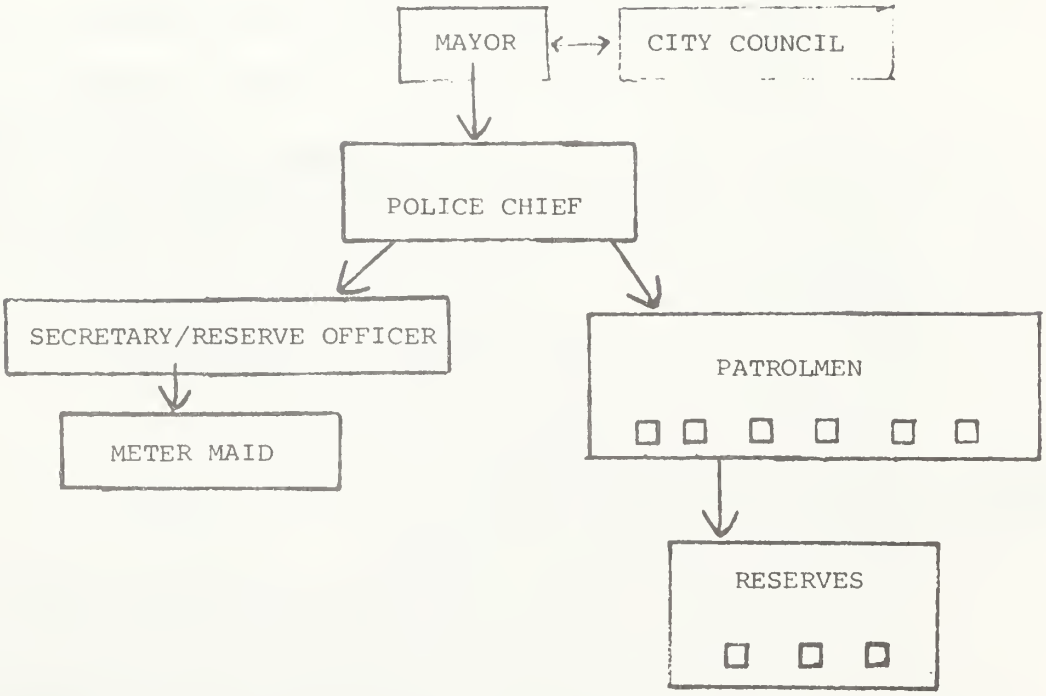
- How is the quality of service measured to insure compliance with legal mandate? Police Chief monitors personnel.

- Is an annual report available for the department or agency?

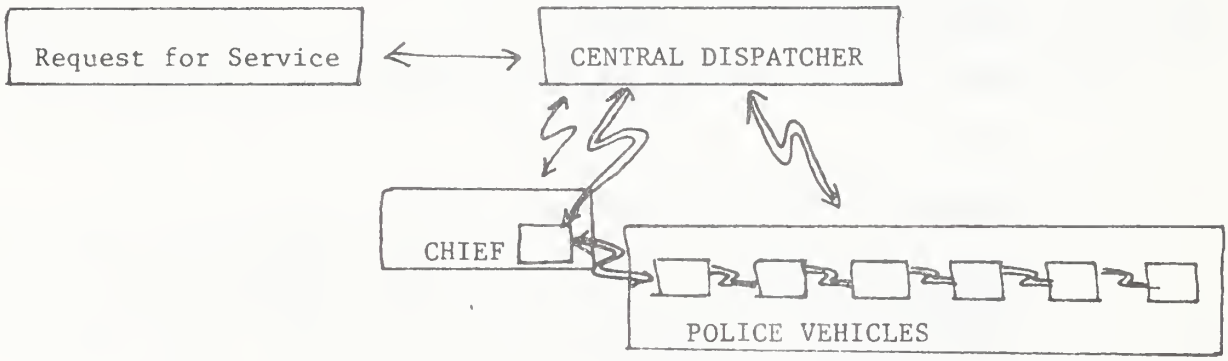
[X] Yes [ ] No Yearly statistical report
Monthly report of activities

DILLON POLICE DEPARTMENT
ORGANIZATION STRUCTURE

FORM 2N



DILLON POLICE DEPARTMENT
COMMUNICATION SYSTEM



RADIO ONLY

TELEPHONE ONLY

RADIO AND TELEPHONE

Each officer also has a portable 2-way radio for use when out of the vehicle.

POLICE

FORM 7N

SERVICE/COMPLAINT SYSTEM DATA

0 User Access

1. In the department, who answers initial service or complaint calls (i.e., secretary, clerk, switchboard operator, dispatcher, . . .)?
   Central dispatcher→Secretary (reserve officer) for non-emergency matters

2. What percent are received via telephone 100, radio _____, and walk-in _____?

3. Number of complaint positions (total). One (1)

4. What is the position-manning schedule? 8AM-5PM/MONDAY-FRIDAY for Secretary. Continuous manning at Central Dispatch Center.

5. Describe capabilities provided at each position?
   - Position No. 1 _____
   - Position No. 2 _____

6. Does the complaint taker maintain some type of status system (i.e., board, file, . . .)? ___ Yes X No Explain: _____

7. What special emergency procedures are set-up for the service/complaint room? see Central Dispatch information, p. 11

8. Describe any other activity in the service/complaint room besides the taking of service requests or complaints. Routine secretarial work

9. How do messages get from the call taker to the dispatcher? _____
   Telephone back to dispatcher

What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages Sept-Dec 1980	Total Number of Messages During Monitored Busy Period	Average Radio System Delay During Busy Period (seconds)
KXK 427	1633	72	
		Length of Busy Period (Hours)	5 hrs/day
		Time and Date of Monitoring	8/25-9/7/80 9 PM-2 AM

What is the volume of phone calls? (Enter below)

Telephone Number	Total Number of Calls Sept-Dec 1980		Total Number of Calls During Monitored Busy Period	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
	843	707	30	0
	Length of Busy Period (Hrs)		5 hrs/day	
	Time and Date of Monitoring		8/25-9/7/80 9 PM-2 AM	

What percent of your service/complaint requests are received via:

Telephone	44%	(1550)
Radio	47%	(1633)
Walk-in	9%	(316)
		~~(3499)~~

Terminal Volume Data

For each data file what was the volume of information requests, entered messages, cancelled messages during past year? (Enter below)

Computer System	Number of Information Requests	Number of Messages Entered	Number of Messages Cancelled	Number of Miscellaneous Uses (specify what)

(see App. E (E-6)

FORM 10N

MAINTENANCE SYSTEM DATA

o Maintenance Service

Does agency have own maintenance service organization? [ ] Yes [x] No

o Self-Servicing Agency

1. Number of technicians _____

2. Location of service facility(s) _____

3. Are there any current plans for service-shop changes? _____

4. Other data: _____

o Contract or Other Service

1. Who is the servicing agency (company, other agency, etc.)? Beaverhead Electronics

2. Where are they located? 365 No. Parkview
Dillon, Mt.

3. Number of technicians? 2 part-time

4. Must mobiles go to shop for service? [ ] Yes [x] No Depends on repairs needed

5. Other data: Repairs are done on a case by case basis.

6. Average length stay in shop? variable

7. Yearly expenditure on maintenance? July 1, 1980 till Feb. 24, 1981 they spent $191.98 on maintenance.

8. Design system recommendations: Very satisfied with system. Would like 911 telephone system NOW.

III. ASSESSMENT AND CRITIQUE

A. INTERVIEWS ORDER

Preliminary contact with the mayor and one county commissioner should be established several weeks in advance of the actual visit to the area; the scope and purpose of the Needs Assessment should be explained and the receptiveness of the officials can be determined. At that time it can be learned if the city or county utilizes a centralized dispatch system (CDS).

If a CDS exists, a telephone conference with a dispatcher will yield names of all users of the system, and interviews can be arranged with no oversights. If no CDS exists, the following agencies or departments are probably land/mobile radio system users:

County Commissioners/Sheriff/Road Crews/Search and Rescue/Ski Patrol/Fire Department/Emergency Medical Services/Civil Defense/Mayor/Police/Water and Sewers/Streets and Alleys/Montana Highway Patrol/Fish and Game/Forest Service/Stock and Brand Inspector/Veterinarians.

An initial meeting with a county commissioner should facilitate the entry into other county offices. The organizational structure of the county, including all land/mobile radio system users, can be obtained from the commissioner, as well as information on budgetary matters. A broad overview of county government, together with inter-agency relationships and division or sharing of equipment and responsibilities can be assessed at the beginning of the project. Questions on fiscal matters which might necessitate some research can be initiated early, giving personnel ample time to find accurate answers.

In the same way, an early meeting with the mayor facilitates entry into the city government.

Next, and likely to be most valuable in terms of information, are the Sheriff's Department and the Police Department. These are probably the primary users of a land/mobile radio system and are most likely to keep a written log of communications. Their departments interact with, and perhaps supervise, other users.

Other agency and department interviews can be scheduled in any convenient order. Each interview with a county commissioner, the mayor, and primary users (i.e., sheriff and police), lasted three to four hours. Each interview with secondary users will probably require from one to one and one-half hours.

	Interview:
Preliminary telephone call County Commissioner/Mayor	County Commissioner/Mayor
	Sheriff/Police
	Remaining agencies

III. B. SUGGESTED REVISIONS FOR LAND/MOBILE NEEDS ASSESSMENT METHODOLOGY

The existing methodology contains needless descriptive text and examples. To understand the interview project and its goals, text and examples are certainly necessary, but I suggest that a separate training packet be designed for that purpose. The current interview packet includes many pages which must be ignored during the interview; this increases the likelihood of overlooking necessary questions.

I suggest two revised methodologies, each designed to improve the flow of the interview as well as to minimize the risk of omitting questions. In both revised methodologies I have deleted repetitious material and consolidated or clarified questions and forms.

The first revision (i) is for those areas or agencies who are not serviced by a central dispatch system; the second

(ii) is for those areas and agencies who are serviced by a central dispatch system.

Revision i

LAND/MOBILE RADIO SYSTEM

NEEDS ASSESSMENT METHODOLOGY

METHODOLOGY FOR AGENCIES **NOT** SERVED BY A CENTRAL DISPATCH SYSTEM

The following information should be obtained from the County Commissioner and the Mayor:

(Much of the geographical and demographic material can be gathered before the visit at the Department of Community Affairs or the State Library, in Helena. Information thus gathered should be verified and supplemented during the personal interview with the officials.)

Address: _____

_____

_____ Telephone: _____

(Check box when task completed)

☐ Organizational structure of the local government (attach sketch and include ALL appropriate land/mobile radio system users)

☐ Special interagency relationships (attach sketch).

Will form of government change? How?

_____

_____

_____

_____

☐ Maps of the city and the county, with changes and proposed changes noted.

Population Trends

Steady-increase-decrease? How much? Shifts within areas? _____

_____

_____

Tax Bases & Budgets

What significant changes might occur in the tax base?_____

_____ _____

_____

Will operating budgets be affected: How?_____

_____

_____

Economic Class Proportions of Population

As population grows will low - middle - high income groups in terms of % of total population?

If so, how?_____

_____

_____

Is there a seasonal fluctuation in population?_____

☐ How are the agencies (land/mobile radio system users) funded? (give details and actual $$ figures for each agency).

☐ What is the telecommunications budget? (give details and actual figures for each agency). Use chart on page 75 (or p. 88 for Revision ii)

Name of telephone service provider._____

_____

☐ Will city/county contact the telephone company and request a 30 day monitoring of each agency line to determine (1) percent of calls which receive a busy signal (2) percent of time all lines are busy?

AL YEAR	AGENCY		AGENCY		AGENCY		AGENCY		AGENCY		AGENCY	
	Install-ation	Monthly	Install-ation	Monthly	Install-ation	Monthly	Install-ation	Monthly	Install-ation	Monthly	Install-ation	Month
EPHONE INES: RGENCY												
NISTRATIVE												
EPHONE INES: RGENCY	AGENCY		AGENCY		AGENCY		AGENCY		AGENCY		AGENCY	
	Instal.	Monthly	Instal.	Monthly	Instal.	Monthly	Instal.	Monthly	Instal.	Monthly	Instal.	Month
NISTRATIVE												
O/MOBILE RADIO YSTEM	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purch
O/MOBILE RADIO YSTEM	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purc

AL TELECOMMUNICATIONS BUDGET
OR FY _____ _____ CITY _____ COUNTY

LAND/MOBILE RADIO SYSTEM

NEEDS ASSESSMENT METHODOLOGY

(i) METHODOLOGY FOR AGENCIES NOT SERVED BY CENTRAL DISPATCH SYSTEMS

Agency name _____

Agency function _____

_____

Supervisor _____ Address of Agency _____

Respondent _____ _____

Telephone(s) _____

Manager/Communications _____ _____

Communications Engineer/Planner _____ _____

Other key personnel _____

_____

_____

Land/Mobile System Identification

1. Is the land/mobile physical inventory completed?

   Yes ☐ (Review & attach) No ☐ (Geographically define & attach sketch)

☐ Verify or obtain agency management or organizational structure.

☐ Verify or obtain special interagency relationships.

Communication System Functions

2. Is the agency established under authority of Montana Codes?

   Yes ☐ No ☐
   What establishes the legal mandate to provide the service? Does it clearly define the client system and geographical jurisdiction?

   _____

   _____

   _____

3. Who are the primary and secondary clients of the defined system? _____

_____

4. How is the quality of service measured to insure compliance with legal mandate?

_____

_____

5. Is an annual report available for the department or agency?

Yes ☐ No ☐

6. Address of source: _____

_____

_____

7. What communication systems are presently used by the agency?(Attach diagram of communication paths and equipment used for each path.)

Projected expenditures and new purchases.

_____

_____

8. Do you foresee any changes in your telecommunications operating budget and expenditures?

Yes ☐ (describe) No ☐

_____

_____

_____

_____

_____

Service/Complaint System Data

9. Does the agency have a designated communication center in the defined area for receipt of complaints and dispatch or coordination of resources?

Yes ☐ No ☐

How many? _____

10. In the department, who answers initial service or complaint calls (i.e., secretary, clerk, switchboard operator, dispatcher, . . .)?

_____

11. What percent are received via telephone_____, radio_____, and walk-in_____?

12. Number of complaint positions (total)._____

13. What is the position-manning schedule?_____

_____

_____

14. Does the complaint taker maintain some type of status system (i.e., board, file, . . .)? Yes ☐ No ☐ Explain:_____

_____

15. What special emergency procedures are set-up for the service/complaint room?_____

_____

16. Describe any other activity in the service/complaint room besides the taking of service requests or complaints._____

_____

17. How do messages get from the call taker to the dispatcher?_____

_____

_____

Telephone Access System Data

18. Name of telephone service provider(s) (i.e., common carrier - Bell, GTE,. . .)

_____

19. Does department have separate emergency and administrative phone numbers?

Yes ☐ No ☐

a. If no, how many incoming lines are there?

b. If yes, how many incoming lines are there for: Emergency_____

Administration_____

c. Does the department utilize 911? ____Yes ____ No

If yes, explain: _____

_____

d. How many unlisted number lines does the department have for its own business?_____

e. Are telephone lines recorded? Yes ☐ No ☐

20. What is the volume of phone calls? (enter below)

Telephone Number	Total Number of Calls Past Year		Total Number of Calls During Monitored Busy Period	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
Length of Busy Period (Hours) _____ Time and Date of Monitoring _____				

☐ What are the costs? (Confirm or collect figures from chart p. 75)

Example:

Type of Line	Installation	Monthly
Emergency		
Administrative		

21. Is there any backup telephone equipment? Yes ☐ No ☐

If yes, describe backup._____

22. Do the operators handle telephone calls for other services (e.g., fire, public works)? Yes ☐ No ☐

If yes, which services?_____

Dispatch System Data

23. Number and location of dispatcher positions?_____

24. What is the dispatch position manning schedule?_____

25. Are radio channels recorded? ☐ Yes ☐ No

26. Who selects service response?_____

27. Who services or prepares complaint form?_____

28. Who marks service unit back in service?_____

29. How many status levels (i.e., available, enroute, on assignment, out of service, . . .) are there for field personnel?_____

30. What are they?_____

31. Are any levels of status of low priority so that a man assigned to a lower level complaint can be reassigned to a higher level complaint?

Yes ☐ No ☐

32. Describe the status level priorities and who decides to reassign a man.

33. Are there any priorities assigned to complaint assignments (e.g., immediate dispatch, delayed dispatch). Yes ☐ No ☐

34. If yes, describe the priorities and how the priority of a complaint is determined and then communicated to service providers._____

Dispatch Volume Data

35. What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages Past Year	Total Number of Messages During Monitored Busy Period	Average Radio System Delay During Busy Period (seconds)
		Length of Busy Period (hours) _____	
		Time and Date of Monitoring _____	

36. What was the average message length_____seconds?

37. Does the dispatcher handle radio messages for other services (e.g., fire, public works)? ☐ Yes ☐ NO

38. If yes, which services?_____

_____

39. Other data:_____

_____

40. What volume for: personal uses? _____

41. What volume for: repeats? _____

42. What volume for: abuses? _____

43. Does the agency have a computer or teletype terminal?

☐ Yes ☐ No

44. If the terminal position is not equipped for radio operation how does the ratio dispatcher send information requests to the terminal operator and get back the required information? _____

_____

_____

45. If each terminal is not at a dispatcher location, is the terminal location equipped with a control unit so that the terminal operator can communicate with field forces? Yes No

If no, how is the information transfered to the field forces?

_____

_____

Computer System	Number of Information Requests	Number of Messages Entered	Number of Messages Cancelled	Number of Miscellaneous Uses (specify what)

46. Other data: _____

_____

Maintenance Service

47. Does agency have own maintenance service organization? ☐ Yes ☐ No

Self-Servicing Agency

a. Number of technicians _____

b. Location of service facilities? _____

_____

_____

c. Are there any current plans for service-shop changes? _____

_____

d. Other data: _____

Contract or Other Service

e. Who is the servicing agency (company, other agency, etc.)? _____

_____

f. Where are they located? _____

_____

_____

g. Number of technicians? _____

h. Must mobiles go to shop for service? ☐ Yes ☐ No

i. Other data: _____

_____

_____

48. Average length stay in shop? _____

_____

_____

49. Design system recommendations: _____

_____

_____

_____

_____

_____

_____

50. Coordination and interface with others _____

_____

Preparedness for Emergencies (record on reverse side).

- [ ] A. What can cause a major element of the system to fail?
- [ ] B. How likely is each possible cause of failure?
- [ ] C. Is it likely that an element and its back-up will fail at the same time, for the same reason?
- [ ] D. Is the cause that produces a failure likely to create also an unusually heavy demand for services?
- [ ] E. Can the primary back-up provide an adequate level of service in most situations?
- [ ] F. If the primary back-up fails, will the secondary back-up (if there is one) be able to maintain an adequate level of service?
- [ ] G. How quickly can the back-up facility be put into operation?
- [ ] H. Is maintenance service provided on a 24-hour per day, 7-day per week basis to ensure continuous system operation?
- [ ] J. Are communication equipment and personnel well protected against damage and interference with their duties?

LAND/MOBILE RADIO SYSTEM

NEEDS ASSESSMENT METHODOLOGY

METHODOLOGY FOR AGENCIES SERVED BY A CENTRAL DISPATCH SYSTEM

The following information should be obtained from the County Commissioner and the Mayor:

(Much of the geographical and demographic material can be gathered before the visit at the Department of Community Affairs or the State Library, in Helena. Information thus gathered should be verified and supplemented during the personal interview with the officials).

Address: _____

_____

_____ Telephone: _____

heck box
hen task
ompleted)

☐ Organizational structure of the local government (attach sketch and include ALL appropriate land/mobile radio system users)

☐ Special interagency relationships (attach sketch).

Will form of government change? How?

_____

_____

_____

_____

☐ Maps of the city and the county, with changes and proposed changes noted.

Population Trends

Steady-increase-decrease? How much? Shifts within areas? _____

_____

_____

Tax Bases & Budgets

What significant changes might occur in the tax base?_____

Will operating budgets be affected: How?_____

Economic Class Proportions of Population

As population grows will low - middle - high income groups in terms of % of total population?

If so, how?_____

Is there a seasonal fluctuation in population?_____

☐ How are the agencies (land/mobile radio system users) funded? (give details and actual $$ figures for each agency).

☐ What is the telecommunications budget? (give details and actual figures for each agency). Use chart on page 88.

Name of telephone service provider._____

☐ Will city/county contact the telephone company and request a 30 day monitoring of each agency line to determine (1) percent of calls which receive a busy signal (2) percent of time all lines are busy?

YEAR	AGENCY Install-ation	Monthly	AGENCY Install-ation	Monthly	AGENCY Install-ation	Monthly	AGENCY Install-ation	Monthly	AGENCY Install-ation	Monthly	AGENCY Install-ation	Monthly
HONE ES:												
ENCY												
STRATIVE												
HONE ES:	AGENCY Instal.	Monthly	AGENCY Instal.	Monthly	AGENCY Instal.	Monthly	AGENCY Instal.	Monthly	AGENCY Instal.	Monthly	AGENCY Instal.	Monthly
ENCY												
STRATIVE												
OBILE DIO TEM	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchas
OBILE IO TEM	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchases	AGENCY Mainten.	Purchas

TELECOMMUNICATIONS BUDGET

FY _____ _____ CITY _____ COUNTY

LAND/MOBILE RADIO SYSTEM NEEDS ASSESSMENT METHODOLOGY FOR AGENCIES SERVED BY A CENTRAL DISPATCH SYSTEM

The following information should be obtained from the supervisor of the Central Dispatch System.

CENTRAL DISPATCH SYSTEM (CDS) SUPERVISOR

Name _____

Respondent (if different) _____

Agency address _____ Telephone(s) _____

_____ _____

_____ _____

Manager/Communications _____ _____

Communications Engineer/Planner _____ _____

Agencies served by the Central Dispatch System	Is land/mobile physical inventory complete?	
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐
_____	Yes ☐	No ☐

(Review&Attach) Geographically define the system service area(i.e. city/county/district)

1. What establishes the legal mandate to provide the service? Does it clearly define the client system and geographical jurisdiction?_____

_____

_____

_____

2. How is the quality of service measured to insure compliance with legal mandate?_____

_____

_____

3. Are there problems in complying with F.C.C. regulation? ☐ Yes ☐ No

_____

_____

_____

4. Are there funding restraints which make it difficult to perform necessary communications on a satisfactory level ☐ Yes(describe) ☐ No

_____

_____

_____

_____

5. What communication system functions are used for each agency served? (Attach functional flow charts)

6. Are there instances where better communications could be established by coordinating and sharing equipment with neighboring counties or states? (describe)_____

_____

_____

_____

_____

Telephone System Data

7. Name of telephone service provider _____

8. How many incoming lines are there?

   Emergency _____ Administrative _____ Unlisted _____

9. Are telephone lines recorded? ☐ Yes ☐ No

10. Is 911 used? ☐ Yes (list departments and define geographical area served) ☐ No

_____

_____

_____

_____

_____

_____

11. Has the telephone company been contacted to monitor agency lines?

    ☐ Yes ☐ No Estimated percent of time agency lines are all busy _____

12. Is there any back-up telephone equipment? ☐ Yes ☐ No

    (Describe) _____

13. How often in the past 10 years has the system failed? _____

14. For what reason(s)? _____

_____

_____

Service/Complaint and Dispatch System Data

15. Who answers the initial service or complaint calls (i.e., secretary, clerk, switchboard operator, dispatcher, . . .)? _____

_____

16. What percent are received via telephone_____, radio_____, and walk-in_____?

17. Total number of service/complaint positions, and their location_____

_____

_____

18. Total number of dispatcher positions, and their locations _____

_____

_____

19. What is the position manning schedule?

Service/Complaint	Dispatch

20. Does the service/complaint call taker also dispatch?

Yes ☐ No ☐ If no, how does message get from call taker to dispatcher?

_____

_____

_____

21. Who selects the service response? _____

22. Who services or prepares the complaint form? _____

_____

23. Who marks service unit back in service? _____

_____

24. Are radio messages recorded? ☐ Yes (explain) ☐ No

_____

_____

_____

25. Describe any other activities in the service/complaint room beside the taking of service requests or complaints.

_____

_____

26. Describe any other activities in the dispatch room besides the dispatching of messages.

_____

_____

27. Does the complaint taker maintain some type of status system (i.e., board, file, log . . .)? ☐ Yes ☐ No

If yes, explain _____

_____

_____

28. How many status levels (i.e., available, enroute, on assignment, out of service . . .) are there for field personnel? _____

29. What are they? _____

30. Are any levels of status of low priority so that a man assigned to a lower level complaint can be reassigned to a higher level complaint?

☐ Yes ☐ No

31. Describe the status level priorities and who decides to reassign a man.

_____

_____

32. Are there any priorities assigned to complaint assignments (e.g., immediate dispatch, delayed dispatch)? ☐ Yes ☐ No

33. If yes, describe the priorities and how the priority of a complaint is determined and then communicated to service providers.

_____

_____

34. (on following sheet)

Maintenance Service

35. Does agency have own maintenance service organization? ☐ Yes ☐ No

(Self-Servicing Agency)

a. Number of technicians _____

b. Location of service facility(s) _____

_____

DATE	RADIO CHANNEL	AGENCY Dispatch	Non-dispatch	AGENCY Dispatch	Non-dispatch	AGENCY Dispatch	Non-dispatch	AGENCY Dispatch	Non-dispatch
Telephone number									

c. Are there current plans for service-shop changes? _____

_____

d. Other data _____

(Contract or Other Service)

e. Who is the servicing agency (company, other agency, etc.)?

_____

f. Where are they located? _____

_____

g. Number of technicians? _____

h. Must mobiles go to shop for service? ☐ Yes ☐ No

i. Other data _____

_____

_____

36. Average length stay in shop? _____

37. Design system recommendations: _____

_____

_____

_____

38. Preparedness for Emergencies (record on reverse side).

☐ A. What can cause a major element of the system to fail?

☐ B. How likely is each possible cause of failure?

☐ C. Is it likely that an element and its back-up will fail at the same time, for the same reason?

☐ D. Is the cause that produces a failure likely to create also an unusually heavy demand for services?

☐ E. Can the primary back-up provide an adequate level of service in most situations?

☐ F. If the primary back-up fails, will the secondary back-up (if there is one) be able to maintain an adequate level of service?

☐ G. How quickly can the back-up facility be put into operation?

☐ H. Is maintenance service provided on a 24-hour per day, 7-day per week basis to ensure continuous system operation?

☐ I. Are communication equipment and personnel well protected against damage and interference with their duties?

Computer Terminal Facilities Data

39. List below the computer and/or teletypewriter terminals the agency uses. Be sure to indicate if a terminal is shared between two or more networks or information retrieval systems.

_____

_____

_____

40. Who operates the terminals? _____

41. What are the physical locations of the terminals? _____

_____

_____

42. If the terminal position is not equipped for radio operation, how does the radio dispatcher send information requests to the terminal operator and get back the required information?

_____

_____

Resource Control Data

43. If each terminal is not at a dispatcher location, is the terminal location equipped with a control unit so that the terminal operator can communicate with field forces? ☐ Yes ☐ No

44. If no, how is the information transferred to the field forces?

_____

_____

Terminal Volume Data

45. For each data file, what was the volume of information requests, entered messages, cancelled messages during the past year? (Enter below)

Computer System	Number of Information Requests	Number of Messages Entered	Number of Messages Cancelled	Number of Miscellaneous Uses (specify what)

Other data: _____

_____

The following information should be obtained from individual agency or department supervisors:

Verify or obtain:

☐ 46. Agency/department management structure

☐ 47. Special interagency relationships

☐ 48. Communication systems chart

☐ 49. Telecommunications budget (give details and figures)

☐ 50. Geographical map or definition of service area

☐ 51. Volume of telephone and L/M radio traffic

52. Agency Name _____

53. Agency Function _____

54. Agency Address _____

55. Telephone(s) _____ _____

_____ _____

56. Supervisor _____

Respondent (if different) _____

Land/Mobile System Identification

57. Is the land/mobile physical inventory completed?

☐ Yes (Review and attach) ☐ No (Geographically define and attach sketch)

Communication System Functions

58. Is the agency established under authority of Montana Codes?

☐ Yes ☐ No
What establishes the legal mandate to provide the service? Does it clearly define the client system and geographical jurisdiction?

_____

_____

_____

59. Who are the primary and secondary clients of the defined system?

_____

_____

60. How is the quality of service measured to insure compliance with legal mandate?

_____

_____

61. Is an annual report available for the department or agency?

☐ Yes ☐ No

Address of source _____

_____

62. Projected expenditures and new purchases _____

_____

_____

63. Do you foresee any changes in your telecommunications operating budget and expenditures? ☐ Yes ☐ No

_____

_____

_____

Service/Complaint System Data

64. Does the agency have a designated communication center other than central dispatch system for receipt of complaints and dispatch or coordination of resources? ☐ Yes ☐ No
How many? _____ (If no, STOP HERE)

65. In the department, who answers initial service or complaint calls (i.e., secretary, clerk, switchboard operator, dispatcher...)?

_____

66. What percent are received via telephone _____, radio _____, and walk-in _____?

67. Number of complaint positions (total) _____

68. What is the position-manning schedule? _____

_____

_____

69. Does the complaint taker maintain some type of status system (i.e., board, file . . .)? ☐ Yes ☐ No (Explain)

_____

70. Describe any other activity in the service/complaint room besides the taking of service requests or complaints.

_____

_____

71. How do messages get from the call taker to the dispatcher or vice versa?

_____

_____

72. Does department have separate emergency and administrative phone numbers?

☐ Yes ☐ No

a. If no, how many incoming lines are there? _____

b. If yes, how many incoming lines are there for: Emergency _____, Administration _____.

c. Does the department utilize 911? ☐ Yes ☐ No

If yes, explain _____

_____

d. How many unlisted number lines does the department have for its own business? _____

e. Are telephone lines recorded? ☐ Yes ☐ No

73. What is the volume of phone calls? (Enter below)

Telephone Number	Total Number of Calls Past Year		Total Number of Calls During Monitored Busy Period	
	Dispatch	Non-Dispatch	Dispatch	Non-Dispatch
Length of Busy Period (Hours) _____ Time and Date of Monitoring _____				

74. What are the costs? (Confirm or collect figures from chart, p. 88)

Example:

Type of Line	Installation	Monthly
Emergency		
Administrative		

75. Is there any back-up telephone equipment? ☐ Yes ☐ No

If yes, describe back-up _____

76. Do the operators handle telephone calls for other services (e.g., fire, public works? ☐ Yes ☐ No

If yes, which services? _____

Dispatch System Data

77. Number and location of dispatcher positions? _____

_____

_____

78. What is the dispatch position manning schedule? _____

_____

_____

79. Are radio channels recorded? [ ] Yes [ ] No

80. Who selects service response? _____

81. Who services or prepares complaint form? _____

82. Who marks service unit back in service? _____

83. How many status levels (i.e., available, enroute, on assignment, out of service, . . .) are there for field personnel? _____

84. What are they? _____

85. Are any levels of status of low priority so that a man assigned to a lower level complaint can be reassigned to a higher level complaint?

Yes [ ] No [ ]

86. Describe the status level priorities and who decides to reassign a man.

_____

_____

87. Are there any priorities assigned to complaint assignments (e.g., immediate dispatch, delayed dispatch). Yes [ ] No [ ]

88. If yes, describe the priorities and how the priority of a complaint is determined and then communicated to service providers. _____

_____

_____

Dispatch Volume Data

89. What is the volume of radio messages? (Enter below)

Channel	Total Number of Messages Past Year	Total Number of Messages During Monitored Busy Period	Average Radio System Delay During Busy Period (seconds)
		Length of Busy Period (hours) _____	
		Time and Date of Monitoring _____	

90. Does the dispatcher handle radio messages for other services (e.g., fire, public works)? ☐ Yes ☐ No

91. If yes, which services? _____

92. Other data _____

_____

_____

93. What volume for personal uses? _____

94. What volume for repeats? _____

95. What volume for abuses? _____

Maintenance Service

96. Does agency have own maintenance service organization? ☐ Yes ☐ No

(Self-Servicing Agency)

a. Number of technicians _____

b. Location of service facility(s) _____

_____

c. Are there any current plans for service-shop changes? _____

_____

d. Other data _____

(Contract or Other Service)

e. Who is the servicing agency (company, other agency, etc.)?

_____

f. Where are they located? _____

_____

g. Number of technicians? _____

h. Must mobiles go to shop for service? ☐ Yes ☐ No

i. Other data _____

_____

97. Average length stay in shop? _____

98. Design system recommendations? _____

_____

_____

III. C. CRITIQUE OF THE MONITORING FORMS

Telephone Tally	Telephone Message Length Sheet
Radio Tally	Radio Message Length Sheet

The telephone tally and radio tally sheets required some explanation by the interviewer, but were, on the whole, understandable by the data collector. Both forms were used at the City of Dillon administrative office. No other participating agencies/departments operated independently of the Beaverhead Central Dispatch System.

The City of Dillon keeps no record of its telecommunications transactions. The city agreed to record the desired information for a 2-week (10-work day) period (see Appendix C) in its office of the secretary/receptionist/dispatcher. Pinpointing a "busy period" for this office was not possible as hourly fluctuations in communications do not occur, except during emergencies.

I did not request data for the telephone and radio message length sheets. Because the telephone/dispatch person is also the receptionist/secretary, and because the telephone and radio tallies were already demanding much time, I decided not to overburden her and perhaps antagonize officials. If the message length information is deemed to be important to the Telecommunications Project, I suggest that someone be hired by the Telecommunications Department for the express purpose of gathering that data.

The Beaverhead Central Dispatch System is an extremely busy system. Only one dispatcher is on duty at any time, thus it is difficult for that person to provide our requested tallies in addition to performing normal duties. I would again suggest that a person be hired by the Telecommunications Department to collect the information.

The Beaverhead County Central Dispatch System maintains accurate written logs of all communications transactions. After studying these logs, I designed a chart whereby some of the desired information could be tallied from existing records. Message types were coded by department, by radio channel or telephone line, and by dispatch or non-dispatch status (see Appendix D).

The dispatchers worked on these tallies during less eventful periods (i.e., 2 AM - 6 AM) and yielded the three-month data contained in Appendix E. Because each log has over 50 lines for transactions, each day may take several pages, and each month could contain over 100 pages of logged information, it would take significant time to codify a one-year period. Once again I propose that the Telecommunications Department hire someone to do this. The cooperation of Beaverhead County and City of Dillon personnel is not likely to be repeated throughout all Montana counties. The dispatchers contributed much energy and time, and deserve commendation from the Telecommunications Department for the work they have done.

III. D. ITEMS FOR PHYSICAL INVENTORY

DISPATCH SYSTEM DATA:

Describe capabilities provided at each position.

Position No. 1 _____

_____

Position No. 2 _____

_____

Position No. 3 _____

_____

Does the dispatcher have supervisory control over remote transmit locations? Yes ☐ No ☐

Does the dispatcher switch these locations in and out, or are they connected at all times? _____

Maintenance Support

Telephone_____

Land/Mobile_____

Other_____

_____

F.C.C. Compliance_____

_____

Control Center Facilities_____

_____

Telephone

Trunk Line_____

Control pair_____

Switching_____

Other_____

Radio Coverage and Interference

Traffic (radio) density_____

Interference (co-channel, adjacent channel, intermodulation, . . .)_____

Other_____

_____

Other Issues

New Technology_____

_____

Frequency Spectrum Availability_____

_____

The following agencies or departments are probably land/mobile radio system users:

County Commissioners	Sheriff & Deputies
Road Crews(city&county)	Search & Rescue
Ski Patrol	Fire Department (several districts)
Emergency Medical Services	Civil Defense
Mayor	Police & Patrolmen
Water & Sewers	Streets & Alleys
Montana Highway Patrol	Fish & Game
Forest Service	Stock/Brand Inspector
Veterinarians	

List below the computer and/or teletypewriter terminals the agency uses. Be sure to indicate if a terminal is shared between two or more networks or information retrieval systems._____

_____

_____

Who operates the terminals?_____

What are the physical locations of the terminals?_____

BEAVERHEAD COUNTY - 1980-81

(All levies are given in mills)
Taxable Valuation - $17,947,567
1979-80 Taxable Valuation - $16,385,338

STATE FUNDS		5.65
COUNTY FUNDS		
General		23.50
Road		12.00*
Bridge		5.00
Poor		6.25
Extension Agent		1.00
Fair		1.25
Airport		.45
Weed		1.00
Senior Citizens		.50
Hospital		3.00
Cemetery		2.00
Sub-Total (Last Year 50.85)		55.95
High School General	15.00	
Transportation	2.76	
Retirement	6.86	
Sub-Total	24.62	
General School		25.00
Retirement		10.92
Sub-Total		35.92
GRAND TOTAL		122.14

CITY OF DILLON
Taxable Valuation - $3,521,884

General	40.75
Streets and Alleys	12.00
Parks and Playgrounds	4.25
Public Library	4.50
Volunteer Fire	2.00
Metro-Police	1.50
TOTAL (Last Year Same)	65.00

TOWN OF LIMA
Taxable Valuation - $170,793

General	50.10
TOTAL (Last Year 45.50)	50.10

HIGH SCHOOL DISTRICT LEVIES

Dist. Name or Number	General	Insurance	Adult Educ.	Transp. Fund	Bond Int. and Sink.	Total Mills
BCHS	23.98	.46		3.17 (1)	2.71	30.32
Lima	5.68	.32		7.08		13.08

SCHOOL DISTRICT LEVIES

Dist. Number	General	Dist. Transp.	Tuition	Insurance	H.S. Special	Bond Int. and Sink.	Total Mills
7	16.48	12.01	.65		30.32		59.46
10	36.00	7.89	.01	.92	30.32	6.88	82.02
11	24.08	3.51	3.96		30.32		61.87
12	9.44	2.97		.16	13.08	4.05	29.70
16	15.81	1.54	.47	.18	30.32		48.32
19	9.44	2.97		.16	30.32	4.05	46.94
21	16.02				30.32		46.34
22	9.44	2.97		.16	30.32	4.05	46.94
24	25.67	.30			30.32		56.29

26	.01	9.36		30.32	4.36	44.05
33	9.44	2.97	.16	15.79	4.05	(2)32.41
36	9.44	2.97	.16	15.79	4.05	32.41

SPECIAL DISTRICTS

Fire District #1	.02076
Fire District #2	1.50
Fire District #3	3.00

SUBJECT AREAS AND LEVELS OF INSTRUCTION

I. COURSE LEVELS

Basic and In-Service Intermediate Advanced

II. SUBJECT AREAS

Basic and In-Service Courses

1. Introduction to Law Enforcement
2. Police Ethics
3. Laws of Arrest, Search and Seizure, and Criminal Law
4. Rules of Evidence
5. Miranda Decision
6. Civil Liabilities
7. Latent Prints
8. Physical Evidence
9. Dangerous Drugs
10. Bomb Recognition
11. Burglary Investigation
12. Case Preparation
13. Crime Scene Protection
14. Courtroom Demeanor and Testifying
15. Crisis Intervention
16. Description of Persons
17. General Crime Scene Investigation
18. Informant Development
19. Outdoor Arrest Problems
20. Plaster Casting
21. Police Photography
22. Practical Case
23. Sources of Information
24. Police Communication Operations
25. Rumor Clinic
26. Notetaking
27. Abnormal Behavior
28. Handcuffing, Searching Techniques and Transportation of Prisoners
29. Interrogation Techniques
30. Patrol Procedures and Techniques
31. Police Community Relations
32. Police Press Relations
33. Suicide Prevention

34. Public Speaking
35. Report Writing
36. Public Relations
37. Defensive Driving
38. Juvenile Procedures
39. Self-Defense Tactics
40. Firearms Safety
41. Fundamentals of Police Weaponry
42. Firearms (Legal Aspect and Departmental Policy)
43. Firearms Range
44. First Aid
45. Legal Research
46. Court Organization and Procedure
47. Judicial System and Jurisdictions
48. Gambling
49. Assault Cases
50. Auto Theft Cases
51. Robbery Cases
52. Sex Crimes
53. Injury and Death Cases
54. Larceny and Stolen Property
55. Disturbance and Disorderly Conduct Cases
56. Family Disturbance Cases
57. Prowler Cases
58. Traffic Direction
59. Traffic Citations and Arrests
60. Traffic Law Enforcement
61. Accident Investigation
62. Traffic Engineering and Police

Intermediate Courses

63. Bank Robbery Investigations
64. Rape Investigations
65. Crime Scene Photography
66. Interrogations and Interviews
67. Responding to Silent Alarms
68. New Criminal Codes
69. Safe Burglary Demonstration
70. Safe Burglary Investigations
71. Forensic Pathology
72. Firearms Safety
73. Firearms Training
74. Practical Cases
75. Police-Press Relations

Advanced Courses

76. Criminal Justice System
77. Constitutional Law
78. Basis for Law
79. Court Structure and Jurisdiction
80. Court Decisions
81. Criminal Law
82. Rules of Evidence
83. Human Behavior and Relations
84. Abnormal Persons
85. Police and Minority Groups
86. Police and Militant/Non-Conformist Groups
87. Analysis of Patrol
88. Field Notetaking, Recording and Interrogation
89. Officer's Decision Making
90. Organized Crime and Vice
91. White Collar Crime
92. Narcotic and Dangerous Drugs
93. Sex Crimes
94. Tactical Use of Weapons
95. Range Demonstration and Familiarization
96. Police-Juvenile Relations

BASIC COURSE FOR CERTIFICATION OF HIGHWAY PATROLMEN

The amount of training for which certification will be granted in the Basic Course for Highway Patrolmen shall be a total of 560 hours of instruction.

Requirement

1. Successful completion of 560 hours of instruction in the minimum prescribed subject areas at a certified training school:

Curriculum	Hours
I. Introduction to Law Enforcement	96
Notetaking and Orientation	
Effective Writing	
Effective Speaking	
General Semantics	
History of the Patrol	
Montana Geography and History	
Highway Construction and Maintenance	
Highway Patrol Retirement	
Police Ethics and Press Relations	
Rules and Regulations	
Spelling	
Telephone Courtesy	
Communications	
Safety and Education	
Graduation	
II. Police Procedures - General and Traffic	206
Accident Investigation	
Chemical Tests	
Defensive Driving	
Department Forms	
Direction of Traffic	
Drinking Driver Enforcement	
Driver Improvement	
Driver Licensing	
Drugs	
Electrical Emergencies	
Enforcement Tactics	
FBI Lab Services	
Gross Vehicle Weight	
Inspection and Roadblocks	
Police Vehicle Operations	
Radiological Emergency Operation	
Riot Control	
School Bus Inspection	
Stock Inspection	

	Curriculum	Hours
III.	Legal Aspects	92
	Court Demeanor Court Preparation Court Systems Criminal Codes Laws of Arrest Rules of Evidence Rules of the Road Safety Responsibility Search and Seizure	
IV.	Defensive Tactics	121
	Firearms Self-Defense Physical Fitness	
V.	First Aid	30
VI.	Equipment	15
	Camera Equipment Equipment and Uniforms Vehicle Equipment	

	1979		1980	
	Offenses Arrests	Index	Offenses Arrests	Index
Murder	[illegible]	[illegible]	1 [illegible]	22.3
Rape	3/3	[illegible]	3/2	[illegible]
Robbery	2/2	44.[illegible]	1/[illegible]	22.3
Assault	28/2[illegible]	524.[illegible]	73/4[illegible]	1[illegible]
Burglary	2[illegible]	[illegible]2.4	52/11	11[illegible]
Larceny	210/3[illegible]	4[illegible]5.4	224/5[illegible]	4[illegible]7.[illegible]
Auto Theft	15/[illegible]	334.7	1[illegible]/3	223.1
Arson	[illegible]	[illegible]	[illegible]	44.[illegible]
Forgery	1/1	22.3	5/5	111.[illegible]
Fraud	4/4	89.2	[illegible]	[illegible]
Vandalism	130/1[illegible]	2[illegible].5	14[illegible]/1[illegible]	3123.[illegible]
Weapons	1/1	22.3	[illegible]/3	[illegible]
Sex Offenses	1/1	22.3	[illegible]	133.[illegible]
Drug Laws	3/3	[illegible]	5/5	111.[illegible]
Family & Child	[illegible]	[illegible]	[illegible]	15[illegible].2
Grand Total	425/111	[illegible]482.4	532/1[illegible]	11.[illegible]

NOTES: Crime index does not include disorderly conduct, resisting arrest, obstructing justice, obstructing a peace officer, escape, liquor laws, juvenile laws, and kidnapping plus all other similar laws.

Crime in Dillon rose 2[illegible]% in 19[illegible] compared to 1979. The average increase in crime between 1974 and 19[illegible] is 11.2% per year.

Dillon can anticipate 592 major crimes in 1981 if the present trend continues. In 1982, [illegible]58 crimes; 1983, [illegible]32 crimes; and 1984, 81[illegible] crimes. (Estimates are based on a [illegible] increase in population)

Crime figures reflect only the crimes reported to police.

	1979	1980
Felony Arrests	11	18
Misd. Arrests	141	174
Juvenile Arrests	2	22
Battered Wives	[illegible]	[illegible]
Disturbance	[illegible]	297
Accidents	187	191
Traffic Stops	743	902
Traffic Citations	398	433
Investigations	[illegible]	[illegible]
Animal Complaints	[illegible]	[illegible]
Alarm Responses	[illegible]	[illegible]
Public Assists	[illegible]	[illegible]
Other Calls	[illegible]	[illegible]
Public Education	1	24

NOTE: Arrest totals reflect the total number of persons arrested, not the total number of charges filed against the arrestees. ie., a person arrested may have multiple charges against him and the totals would only show one arrest.

- EMS Physician Consultants.
- EMS Project Director.
- EMS Systems Coordinators
- EMS Systems Consultants.

Effectiveness of the system in providing manpower should be documented according to the evaluation methods prescribed in Chapter IV.

2. Training - The provision for appropriate training (including clinical training) and continuing education programs which (1) are coordinated with other programs in the system's service area which provide similar training and education and (2) emphasize veterans of the Armed Forces with military training and experience in health care field and of appropriate public safety personnel in such areas.

"Appropriate public safety personnel" includes police, firemen, lifeguards, park rangers and other public employees charged with maintaining the public safety.

The grantee should address curricula utilized that meet national criteria and guidelines established for individual manpower elements; where and by whom is such training being conducted; a description of the certification, recertification and revocation process developed to maintain the quality of EMS personnel; and methods introduced or planned for resolution of skill maintenance problems.

Each program must develop measures of quality and effectiveness of training based upon the evaluation methods prescribed in Chapter IV.

3. Communications - Provisions for linking the personnel, facilities and equipment by centrally coordinated communications systems so that requests for emergency health care services will be handled by a facility which (1) utilizes emergency telephonic screening, (2) utilizes or will utilize the universal emergency telephone number 911, and (3) will have direct communication connections and interconnections with the personnel, facilities, and equipment of the system and with other appropriate emergency medical services systems.

The system should include a command and control center which would be responsible for establishing those communication channels and allocating those public resources essential to the most effective and efficient EMS management of the immediate problem. The center should have the necessary equipment and facilities to permit immediate interchange of information essential for both the system's resource and medical management and control.

Emergency Medical Services Systems "Program Guidelines"
Dept 11 2[illegible]

The EMS communications system must address access, allocation of resources, centralized coordination and medical control for basic life support and advanced life support.

The communication elements should include:

Access providing public interface with the emergency resource system.

- 911.
- Alternative single access number.
- Provisions for auditory handicapped individuals.
- Provision for multilingual access.

Resource Management Function

- Central Dispatch or centrally coordinated dispatch.
- Coordination of EMS and other public services.

Medical Control Function

- Medical communications between field personnel and resource hospital for diagnosis, treatment and triage.

Hospital to Mobile

- Basic voice.

Hospital to Hospital (Resources, Associate)

- Basic voice.
- Advanced biomedical telemetry (optional).

Program operation experience with "911" systems providing access to police, fire, and EMS has shown that approximately 85% of the incoming calls involve police services; 10% fire services, and 5% emergency medical services. Applicants should thoroughly investigate the implementation and use of 911 as the community access number. Funds under this Act may be used to assist implementation of a 911 system commensurate with the level of EMS usage.

A 911 implementation plan should be developed during the planning phase. If the community is not prepared for immediate 911 implementation, the communications plan should set forth a time at which 911 will be reexamined.

HEW supports the ultimate transfer of EMS system communications to the UHF band. Grant applications and EMS system planning documents will be carefully evaluated in accordance with this policy. When the requested project involves a particular completed VHF system, a case by case evaluation of the proposed methods of interface between UHF and VHF systems will be made. Provision for telecommunication equipment must be made at the command control center with appropriate interface to the public safety agency to provide for access by persons with auditory handicaps. In addition, provision must be made for predominate population groups in the area with limited English speaking ability.

The supervising medical control resource facility (communication base) must be responsible for monitoring all ALS communications and notification of other receiving hospital(s) so that they will be aware of the problem, and can assume responsibility for the care of the patient immediately upon arrival to their facility.

This supervising facility is responsible for field decisions of triage and transportation of a patient to an appropriate facility or to a special care unit in accordance with previously developed patient triage/transfer guidelines and agreements.

Effectiveness of the system in providing efficient and effective communication in relation to access, central dispatch and medical control appears in Chapter IV.

Transportation - This component shall include an adequate number of necessary ground, air and water vehicles and other transportation facilities properly equipped to meet the transportation and EMS characteristics of the system area. Such vehicles and facilities must meet appropriate standards relating to location, design, performance, and equipment; and the operators and other personnel for such vehicles and facilities must meet appropriate training and experience requirements.

The elements of transportation should include:

Ground--Basic Life Support

- Radio communication providing for vehicle control, for medical control and consultation.
- Ambulance vehicles meeting GSS (KKK-A-1822) specifications and including equipment recommended by the American College of Surgeons.
- At least two EMT-As.
- Ambulance locations permitting (for 95% of all calls) a maximum of a 30 minute accurate response time in rural areas.

RADIO TALLY SHEET INSTRUCTIONS

1. CITY--Enter the name of the city in which the tally is conducted (e.g., Missoula).

2. DATE--Enter the date on which the tally is conducted (e.g., 7 May 1973).

3. POSITION--Enter the assigned position number at which the tally sheet is being utilized. For example, if there are two positions at which radio calls are processed, each must be provided with a tally sheet and assigned a position number. The POSITION entry for the first position would then be "1 OF 2," and the entry for the second position would be "2 OF 2."

4. SHIFT--Enter the eight hour time span representing the shift over which the tally is conducted (e.g., 8:00 a.m. - 4:00 p.m.).

5. FREQUENCY--Radio messages must be tallied according to the frequency (channel) on which they are processed. Space is provided to record up to four frequencies (i.e., F1, F2, F3 and F4). However, if any or all frequencies have been given a specific name, this name must also be entered in the FREQUENCY column.

6. MESSAGE TYPE--Messages on a particular frequency must be further classified according to type. The five radio message types are:

   - Dispatch--A message that directs a unit or units to respond to a particular incident.
   - Status Change--A message that changes the status of a mobile unit.
   - Records Check--A message that is generated by field personnel requesting information on a person or property (e.g , license check, stolen property check, etc.).
   - Repeat--A message that cannot be understood as transmitted, and which, therefore, requires the individual receiving the message to ask that the sender repeat it.
   - Other--Any message that cannot be classified into one of the types previously described.

It is important to note that a message, as defined for the traffic tally, consists of the two-way conversation between a dispatcher and a unit located in the field regarding one subject (message type). For example, an officer in the field may first request a records check. At some later time, the dispatcher would then relay the required information back to the unit. Even though there was a time lag between these two conversations, they must be counted as only one message.

7. HOURLY TALLIES--This portion of the sheet is used to actually tally radio messages processed in the dispatch center. However, before beginning the tally, the appropriate hour time-interval must be entered in each of the eight column headings under HOURLY TALLIES (e.g., 8-9, 9-10, etc.). Once this has been completed, the tallies may be conducted.

   As each radio message is processed, it must be categorized according to frequency, then according to type of message, and finally, according to hour of the shift (day). As a result of this procedure, a specific box will be located in which to record the tally. Each call is tallied by entering a small vertical tick mark. Typical examples are:

I = 1	~~IIII~~ = 5
II = 2	~~IIII~~ I = 6

   The tally should be conducted for a period of from 21 to 28 days to ensure that the collected data are representative of the actual radio traffic loading.

   Take great care in tallying each radio message because the accuracy of the communications study is primarily dependent upon the accuracy with which the tallies are made. An accurate tally will result in an improved system which is more responsive to the needs of dispatch personnel.

Appendix C

CITY: City of Dillon RADIO TAL SHEET DATE: 11 Mar 1981

POSITION: OF SHIFT: 8:00 - 5:00

FREQ	MESSAGE TYPE	HOURLY TALLIES							
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	00-2:00	2:00-3:00	3:10-4:00	4:00-5:00
F1: Unit 1	DISPATCH								
	STATUS CHANGE								
	RECORDS CHECK								
	REPEAT								
	OTHER								
F2: Unit 3	DISPATCH								
	STATUS CHANGE								
	RECORDS CHECK								
	REPEAT								
	OTHER								
F3: Unit 4	DISPATCH		III	II	II	I	IIII	III	
	STATUS CHANGE								
	RECORDS CHECK								
	REPEAT								
	OTHER				I				
F4: Unit 6	DISPATCH								
	STATUS CHANGE								
	RECORDS CHECK								
	REPEAT								
	OTHER								
			3	2	3	1	3	3	

C-4

CITY: Dillon

RADIO TALLY SHEET

DATE: 26 Feb. 19[illegible]

POSITION: OF

SHIFT: 8:00 to 5:0[illegible]

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:[illegible]
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F2: Unit 2	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER	/		/			/		/	
F3: Unit 4	DISPATCH		//	/	/	/	/	///		
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F4: Unit 6	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									

C-5

CITY: Dillon

RADIO TALLY SHEET

DATE: 27 Feb. 1981.

POSITION: OF

SHIFT: 8:00 to 5:00

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER							I	I	
F2: Unit 2	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F3: Unit 4	DISPATCH		~~IIII~~	IIII	II		II	IIII	I	
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER			II						
F4: Unit 6	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
			5	6	2		2	5	2	

C-6

CITY: Dallas | RADIO TALLY SHEET | DATE: 21 March 19[illegible]

POSITION: OF | SHIFT: 8.00 to 5.00

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F2: Unit 2	DISPATCH			II						
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F3: Unit 4	DISPATCH		I	I	II		III		II	I
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F4: Unit 6	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
		1		3	2		3		2	1

C-7

CITY: Dillon

RADIO TALLY SHEET

DATE: 3 March 1981

POSITION: OF

SHIFT: 8:00 to 5:00

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER							II		
F2: Unit 2	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F3: Unit 4	DISPATCH		I		I		III	~~IIII~~ I	~~IIII~~ III	
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER				I					
F4: Unit 6	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
			1		2		3	8	8	

C-8

CITY: Dillon

RADIO TALLY SHEET

DATE: 4 March 19[illegible]

POSITION: OF

SHIFT: 8:00 to 5:00

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER							I		
F2: Unit 2	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER							III		
F3: Unit 4	DISPATCH		~~IIII~~ ~~IIII~~ I	~~IIII~~ III			~~IIII~~ II	~~IIII~~ II	I	
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER						I			
F4: Unit 6	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									

CIR: Dillon

RADIO TALLY SHEET

DATE: 5 MARCH 1981.

POSITION: OF

SHIFT: 8:00 TO 5:00

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00 9.00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00 3:00	3:00-4:00	4:00-5:00
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F2: Unit 2	DISPATCH									
	STATUS CHANGE			1						
	RECORDS CHECK									
	REPEAT									
	OTHER									
F3: Un-4	DISPATCH		IIII		1	1	~~IIII~~ III	~~IIII~~	II	I
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F4: Unit 4	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
			4	1	1	1	8	5	2	1

C-10

CITY: Dillon RADIO TA SHEET DATE: 6 Mt. Sh

POSITION: OF SHIFT: 8:00 to 5

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00 9:00	9:00 10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00 3:00	3:00-4:00	4:00-5
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F2: Unit 2	DISPATCH									
	STATUS CHANGE			1						
	RECORDS CHECK									
	REPEAT									
	OTHER			1						
F3: Unit 4	DISPATCH	III	1	1	卌		II			
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F4: Unit 6	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
		3	1	3	5		2			

CITY: Dillon

RADIO TALLY SHEET

DATE: 9 March 19[illegible]

POSITION: OF

SHIFT: 2:00 to 5:00

FREQ	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
F1: Unit 1	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F2: Unit 2	DISPATCH									
	STATUS CHANGE			1						
	RECORDS CHECK									
	REPEAT									
	OTHER									
F3: Unit 4	DISPATCH		II	I	I		~~IIII~~	III	II	I
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
F4: Unit 4	DISPATCH									
	STATUS CHANGE									
	RECORDS CHECK									
	REPEAT									
	OTHER									
			2	2	1		5	3	2	1

CITY: City of Dillon RADIO TALLY SHEET DATE: [illegible]

POSITION: OF SHIFT: 8:00 - [illegible]

FREQ	MESSAGE TYPE	HOURLY TALLIES							
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-[illegible]
F1: Unit 1	DISPATCH								
	STATUS CHANGE								
	RECORDS CHECK								
	REPEAT								
	OTHER	/		/					
F2: Unit 2	DISPATCH	/					/		
	STATUS CHANGE		/						
	RECORDS CHECK								
	REPEAT								
	OTHER								
F3: Unit 4	DISPATCH		/	//	///	///	/		
	STATUS CHANGE								
	RECORDS CHECK								
	REPEAT								
	OTHER								
F4: Unit 6	DISPATCH								
	STATUS CHANGE								
	RECORDS CHECK								
	REPEAT								
	OTHER								
		2	2	3	3	3	2		

CITY: Dillon

TELEPHONE TALLY SHEET

DATE: 10/11/8

POSITION: OF

SHIFT: 8:00-5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES							
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
T1:	DISPATCH		~~IIII~~	II	IIII	~~IIII~~	I	~~IIII~~	III
	MULTIPLE CALL								
	ADMINISTRATIVE	II	I	I	II		I	II	II
	OTHER		II	I					
T2:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
T3:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
T4:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
T5:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
		2	8	4	6	4	3	7	5

C-14

CITY: Dillon

TELEPHONE ALLY SHEET

DATE: 26 F[illegible]

POSITION: OF

SHIFT: 8:00 + [illegible]

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-[illegible]
T1:	DISPATCH		////	//	///	/	//	////	/	//
	MULTIPLE CALL									
	ADMINISTRATIVE	//		//	//	//		//		
	OTHER				/		//		/	/
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		2	4	4	6	3	4	6	2	3

CITY: Dillon

TELEPHONE TALLY SHEET

DATE: 2 Feb 1981

POSITION: OF

SHIFT: 8:00 to 5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
T1:	DISPATCH	/	~~////~~	~~////~~	///	/	////	////	/	
	MULTIPLE CALL									
	ADMINISTRATIVE	/	/	/						
	OTHER		//	/	/			///		
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		2	8	7	4	1	4	7	1	

C-16

CITY: Dillon TELEPHONE ALLY SHEET DATE: 2 MA TH 19

POSITION: OF SHIFT: 8:00 to 5:0

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5
T1:	DISPATCH		//	/	/		///	///	///	/
	MULTIPLE CALL									
	ADMINISTRATIVE	/	/	//					///	
	OTHER		/		///		/	/	//	
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER		//	//			/			
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		1	6	5	4		5	4	8	1

C-11

CITY: Dillon

TELEPHONE TALLY SHEET

DATE: 3 March 1981

POSITION: OF

SHIFT: 8:00 to 5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00 9:00	9.00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00 4:00	4:00-5:00
T1:	DISPATCH	II	II		III		IIII	~~IIII~~	~~IIII~~ I	
	MULTIPLE CALL									
	ADMINISTRATIVE		I	I	III		I			
	OTHER	II		I		III		~~IIII~~	II	
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		4	3	2	6	3	5	10	8	

CITY: [illegible] TELEPHONE [illegible]LLY SHEET DATE: [illegible]

POSITION: OF SHIFT: 8:00 to 5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-
T1:	DISPATCH		~~IIII~~ ~~IIII~~ I	~~IIII~~ III			~~IIII~~ I IIII	I	I	
	MULTIPLE CALL									
	ADMINISTRATIVE	II					I			
	OTHER		~~IIII~~ I				IIII	I		
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		2	16	8			14	2	1	1

CITY: Dillon

TELEPHONE TALLY SHEET

DATE: 5 MARCH 1981

POSITION: OF

SHIFT: 8:00 to 5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
T1:	DISPATCH	///	//	////	///	/	~~////~~ //	////	///	/
	MULTIPLE CALL									
	ADMINISTRATIVE	///	/	//			//	/	/	
	OTHER	/		/						
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		7	3	7	3	1	9	5	4	1 / 2

C-20

CITY: Dillon | TELEPHONE TALLY SHEET | DATE: 6 MARCH 19

POSITION: OF | SHIFT: 8:00 to 5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
T1:	DISPATCH	/	///	///	//		/	/	//	/
	MULTIPLE CALL			/						
	ADMINISTRATIVE	//	/	///						
	OTHER									
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		3	4	7	2		1	1	2	1

CITY: Dillon | TELEPHONE TALLY SHEET | DATE: 9 MARCH 1981

CITY: Dillon

TELEPHONE TALLY SHEET

DATE: 9 MARCH 1981

POSITION: OF

SHIFT: 8:00 to 5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES								
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
T1:	DISPATCH		~~IIII~~	II	III		~~IIII~~	III	II	
	MULTIPLE CALL									I
	ADMINISTRATIVE	I	I	I			II	II	I	II
	OTHER			II						I
T2:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T3:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T4:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
T5:	DISPATCH									
	MULTIPLE CALL									
	ADMINISTRATIVE									
	OTHER									
		1	6	5	3		7	5	3	4 / 3

C-22

CITY: [illegible] TELEPHONE [illegible]LY SHEET DATE: [illegible]

POSITION: OF SHIFT: 2:00 5:00

TRUNK	MESSAGE TYPE	HOURLY TALLIES							
		8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5
T1:	DISPATCH	/	////	~~#~~ ///	//	////	//	//	
	MULTIPLE CALL								
	ADMINISTRATIVE	/	/			/	/		//
	OTHER			//		/		/	//
T2:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
T3:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
T4:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
T5:	DISPATCH								
	MULTIPLE CALL								
	ADMINISTRATIVE								
	OTHER								
		2	5	5	2	6	3	3	4

APPENDIX D. Sample chart for Monitoring Central Dispatch System

DATE	RADIO CHANNEL	Agency Dispatch	Non-dispatch	Agency Dispatch	Non-dispatch	Agency Dispatch	Non-dispatch	Agency Dispatch	Non-di...
Telephone Number									

-Beaver Chlad Co

APPENDIX E

TELECOMMUNICATIONS FOR MONTH OF SEPTEMBER 1980

WALK-IN:

1. Sheriff: 98
2. Police: 87
3. Highway Patrol: 3
4. Fish & Game: 2
5. Fire Dept: 0
6. Livestock Inspector: 0
7. Ambulance: 0

KXK 427 REPEATER:

1. Sheriff: 46
2. Fish & Game: 1
3. Highway Patrol: 0
4. Livestock Inspector: 0

KXK 427 REGIONAL & LOCAL:

1. Sheriff: 105
2. Police: 545
3. Fish & Game: 1
4. Highway Patrol: 52
5. Listock Inspector: 1
6. Fire Dept.: 0

WAH 92:

1. Sheriff: 6
2. Police: 0
3. Highway Patrol: 17
4. Livestock Inspector: 0
5. Other Stations: 10

KLV 872: (Ambulance, Search Rescue, & Misc. Calls)

1. Search & Rescue: 2
2. Ambulance: 23
3. Sheriff: 3

WCU 966:

1. Search & Rescue: 1
2. Ambulance: 12

LOW BAND:

WAH 92	State	39.82 MHZ	F-1
KXK 427	State	39.82 MHZ	F-1
	Region	39.88 MHZ	F-2
	Local	39.94 MHZ	F-3
	Repeater	39.56 MHZ	F-4

COUNTY HIGH BAND:

KLV 872	Local	155.805 MHZ	F-1
WCU 966	Repeater	155.100 MHZ	F-2

BARRETT HOSPITAL:

KLV 873	Local	155.805 MHZ	F-1
WCU 966	Repeater	155.100 MHZ	F-2
KQF 612	Amb-Hosp.	155.280 MHZ	F-3
KQF 612	Hosp-Hosp.	155.340 MHZ	F-4

BEAVERHEAD Co

TELECOMMUNICATIONS FOR MONTH OF SEPTEMBER 1980

PHONE DISPATCH:

1. Sheriff: 56
2. Police: 271
3. Highway Patrol: 10
4. Fish & Game: 1
5. Stock Inspector: 1
6. Ambulance: 14
7. Hospital Hotline: 10
8. Fire Phone: 4
9. Fire Hall Hotline

PHONE NON-DISPATCH:

1. Sheriff: 376
2. Police: 282
3. Highway Patrol: 1
4. Fish & Game: 1
5. Stock Inspector: 1

TELECOMMUNICATIONS FOR MONTH OF OCTOBER

WALK-IN:

1. Sheriff: 64
2. Police: 117
3. Highway Patrol: 5
4. Fish & Game: 7
5. Fire Dept: 4
6. Livestock Inspector: 0
7. Ambulance: 2

KXK 427 REPEATER:

1. Sheriff: 33
2. Fish & Game: 16
3. Highway Patrol: 14
4. Livestock Inspector: 0

KXK 427 REGIONAL & LOCAL:

1. Sheriff: 53
2. Police: 460

BEAVERHEAD Co.

TELECOMMUNICATIONS FOR MONTH OF OCTOBER 1980

3. Fish & Game: 13
4. Highway Patrol: 35
5. Livestock Inspector: 6
6. Fire Dept.: 0

WAH 92:
1. Sheriff: 3
2. Police: 0
3. Highway Patrol: 17
4. Livestock Inspector: 0
5. Other Stations: 38

KLV 872: (Ambulance, Search Rescue, & Misc. Calls)
1. Search & Rescue: 0
2. Ambulance: 21
3. Sheriff: 3

WCU 966:
1. Search & Rescue: 0
2. Ambulance: 5

PHONE DISPATCH:
1. Sheriff: 96
2. Police: 244
3. Highway Patrol: 35
4. Fish & Game: 17
5. Stock Inspector: 5
6. Ambulance: 13
7. Hospital Hotline: 8
8. Fire Phone: 12
9. Fire Hall Hotline: 12

BEAVERHEAD CO

1980

E-4

TELECOMMUNICATIONS FOR MONTH OF OCTOBER

PHONE NON-DISPATCH:

1. Sheriff: 198
2. Police: 128
3. Highway Patrol: 10
4. Fish & Game: 7
5. Stock Inspector: 1

TELECOMMUNICATIONS FOR MONTHS OF NOVEMBER & DECEMBER

WALK-IN:

1. Sheriff: 106
2. Police: 112
3. Highway Patrol: 5
4. Fish and Game: 3
5. Fire Dept.: 0
6. Livestock Inspector: 2
7. Ambulance: 0

KXK 427 REPEATER:

1. Sheriff: 45
2. Fish & Game: 2
3. Highway Patrol: 18
4. Livestock Inspector: 2

KXK 427 REGIONAL & LOCAL:

1. Sheriff: 92
2. Police: 619
3. Fish and Game: 5
4. Highway Patrol: 175
5. Livestock Inspector: 15
6. Fire Dept.: 0

BEAVERHEAD CO.

TELECOMMUNICATIONS FOR MONTHS OF NOVEMBER & DECEMBER 1980

E-5

WAH 92:

1. Sheriff: 0
2. Police: 0
3. Highway Patrol: 17
4. Livestock Inspector: 0
5. Other Stations: 20

KLV 872: (Ambulance, Search Rescue, & Misc. Calls)

1. Search & Rescue: 0
2. Ambulance: 10

Phone Dispatch:

1. Sheriff: 99
2. Police: 328
3. Highway Patrol: 22
4. Fish & Game: 3
5. Stock Inspector: 2
6. Ambulance: 31
7. Hospital Hotline: 13
8. Fire Phone: 18
9. Fire Hall Hotline: 18

Phone Non-Dispatch:

1. Sheriff: 333
2. Police: 297
3. Highway Patrol: 26
4. Fish & Game: 3
5. Stock Inspector: 1

BEAUFHELPD Co

TELECOMMUNICATIONS TELETYPE 1980

	Sheriff	Police	Highway Patrol	Fish & Game	Stock Ins
Dec. & Nov.	27	152	12	1	0
NCIC'S	38	67	7	0	0

22 Messages sent from all Departments.

October	28	97	19	12	0
NCIC'S	31	65	4	0	0

13 Messages sent from all Departments.

September	10	63	2	1	0
NCIC'S	23	96	1	0	0

6 Messages sent from all Departments.

Enter NCIC:	Sept. - 4	Oct. - 2	Nov. - 0	Dec. 0
Cancel NCIC:	Sept. - 1	Oct. - 0	Nov. - 1	Dec. 0

BEAVERHEAD Co

TELECOMMUNICATIONS 1980

for two weeks, August 25, 1980 to September 7, 1980
2100 hrs. to 0200 hrs. for Police and Sheriff only.

SHERIFF	POLICE
Phone Dispatch - 7	Phone Dispatch - 30
Non-Dispatch - 1	Non-Dispatch - 0
Walkin - 0	Walkin - 5
KXK 427- 15	KXK 427 - 72

SHERIFF'S DEPARTMENT:
Rick Later.....4808
Mark Doering.....2783
Keith Reeder.....5092
Ray Tash.....6253
[illegible]yson Phipps.....276-3311
M.J. Freeman.....689-2395
Pam Mathson.....6445
****

DISPATCHERS:
Marge Stefanatz.....5615
Joanne Atwood.....4026
Karen Morrison.....6269
Alice Stewart.....5693
Lyla Trafelet.....4718
Bob Hull.....4655
****

POLICE DEPARTMENT:
Tom Depew.....5762
Charles Osborn.....5754
Pat Clark.....4652
Jack Stewart.....5693
Alan Peters.....4562

John Gutcheck.....5781
Jill Happ.....5462
****

MONTANA HIGHWAY PATROL:
Leo Barnett.....5952
Frank Brown.....4560
Harold Forsman.....2614
****

FISH & GAME
Garth Haugland.....6357
Sarge Hoem.....6212
****

STOCK INSPECTORS:
Jack Ripley.....5296
Lloyd Thomas.....2182
Brand Office.....6366
****

JP'S & POLICE JUDGES....4663
Walt Delaney.....5383
Dick Later.....2623
Later's Jewelry.....2121
Frank Roy.....276-3579
U.P. Railroad Depot.....5631
Juv. Off. Frank Hull....2159
****

ATTORNEYS:
Beaverhead Co. Attorney.4306
Duke Giltert, III.....4871
City Attorney.....2612
Duke Gilbert Jr.....5393
Burns & Dwyer.....2282
Frank Davis.....5861
[illegible]m Dooling.....6131
[illegible]hulz,Davis & Warren...2363
Max Hansen.....4391
Doug Smith.....842-5505
Tom Garrison.....842-5528
John Jerdine.....287-3879

BARRETT HOSPITAL.....2324
Air Ambulance.....5242
Ambulance Garage.....2833
Dillon Medical Clinic.....5113
****

CHECK ALERT:
J.C. Penny's.....2992
Roberts Foods.....2357
Coast to Coast.....4412
****

SCHOOLS:
Bvhd. County High School..2361
Garage Building.....4244
Vocational Building.....4401
Physical Education.....4701
Parkview Elementary.....2373
Parkview Junior High.....2368
Mary Innes School.....2901
****

FIRE DEPARTMENT:
Mike Swetish..4446..ofc...4442
Asst. Chief...5730..ofc...4333
****

BEAVERHEAD COUNTY:
Airport.....9969
Assessor.....5612
Civil Defense Dept.....5321
Clerk & Recorder.....2642
Clerk of Court.....5831
Commissioners.....5245
Extension Service.....2842
Coroner....2112 or.....4080
County Planning.....4862
County Shop.....5561
County Weed Control.....2951
Welfare Dept.....2142
Custodial Engineer.....5582
Chris Kraft.....4977
District Judge's Chamber..5841
Treasurer.....5821
****

Montana Power.....2621
Vigilante Electric.....2327
Veterinary Hospital.....2385
Mountain Bell.....6101
****

CITY OF DILLON.....4245
Chamber of Commerce.....5511
****

Radio Maintainance:
Harvey Lake.....4514
Airway Facilities.....4588
****

National Guard Armory.....2892
Sgt. Marty Malesich.....2777
****

SHERIFF'S DEPTS. OUT OF TOWN:
Deputy Faye Bumgarner.267-2167
Anaconda Sheriff.....563-5242
Butte Sheriff.....723-4015
Deer Lodge Sheriff....846-2711
Helena Sheriff.....442-7880
Virginia City Sheriff.843-5351

U.S. Government:
U.S. Forest Service.....23
Post Office.....28
Bureau of Land Management....23
Bureau of Reclamation.....23
****

LETS Bureau.....449-28
Dept. of Immigration.....442-52
Extradition Secretary....449-25
Mt. State Fire Marshall..449-20
Board of Crime Control...449-36
Jack Lodell, Region 51...563-39
Probation Off, J. Riley..723-89
Drug Councilor, Butte....723-65
Mt. Hwy. Patrol, Helena..449-30
"" "" Patrol,Driver Exam.449-36
Montana State Prison.....846-13
Warm Springs.....693-22
Galen.....693-22
Mt. Hwy. Dept. Maintainance..22
Jack Brown, Foreman.....22
****

JAIL COOK:
Jo Kesel.....53

Sherry Dove
683-2717

TOM SCOTT'S HOME PHONE
IS 3-4-85

SEARCH & RESCUE CALL-OUT [illegible]
F1 KLV-873 155.805T 155.805R
F2 WCU-966 155.100T 155.805R
F3 [illegible] 155.[illegible]T 155.[illegible]R

DISPATCHER

B/Ph. 3-2223 S. Shafer H/Ph. 3-5358 18-126 Pager 26 X

[illegible] 3-2322 J. Kajin H/Ph. 3-5535 18-130 X

B/Ph. 3-2892 M. Malesich H/Ph. 3-2777 18-123 Pager 23 X

B/Ph. 3-6290 M. Stocker H/Ph. 3-2233 18-131 X

[illegible] 3-4588 H. Lake H/Ph. 3-4514 18-129 X

3-2368 V. Prophet 3-5331 18-136 X

3-2373 C. Bornhauser 3-4406 18-124 X

1 3-5561 M. Shafer 3-5384 18-127 X

3-5321 R. Johnson 3-5800 18-140 X

3-2371 D. Mathson 3-6445 18-134 X

3-2333 C. Kraft 3-4977 18-128

3 3-2268 J. Watkins 3-5305 18-135 X

3- A. Madsen 3-5889 18-146

2 842-5781 B. Anderson 3-5045 18-132

3- L. Phillips 3-5040 18-144

3-4844 D. Frank 3-4789 18-137

3-5324 G. Nicholas 3-5324 18-139

3-2037 D. Achter 3-4236 18-141

3-4877 P. Scott 3-2205 18-125

Dispatcher calls one of the three [illegible]. The person called in turn calls the other two and also calls M. Stocker and H. Lake. They will call the [illegible] of the [illegible].

[illegible] ENFORCEMENT PERSONNEL

3-2383 R. Later 3-4808 18-1 Pager 01

3-2383 M. Doering 3-2783 18-2 Pager 02

3-2383 K. Reeder 3-5092 18-5 Pager 01

3-2333 [illegible]. Stewart 3-5693 18-145

276-3311 G. Phipps 276-3511 18-3

689-2395 M. Freeman 689-2397 18-4

HOSPITAL PAGING ASSIGNMENTS:

18-70 GROUP PAGING
18-71 O.B. Nurse
18-72 Duty Physician
-73 Exray Technician
18-74 Lab Technician
18-75 Inhalation Technician
18-76 Surgical Nurses (2)
18-77
18-78 Hospital Maintainance
18-79 Nurse Anesthetist

****

EMT'S PAGING ASSIGNMENTS:

18-80 GROUP PAGING
18-81 K. Reeder (Hurst)
18-82 Eberline
18-83 M. Ehrismann
18-84 Chamberlain (Hurst)
18-85 B. Tash
18-86 Lowell
18-87

18-88 Later (Hurst)(PAGE SEPERATELY,NOT ON GROUP PAGING)

18-90 GROUP PAGING
18-91 Murray
18-92 S. Ehrismann
18-93 McGee
18-94 Troedsson (Hurst)
-95 Puyear (Hurst)
18-96 Piazzola
18-97 Mautz
18-98 R. Richardson

****

MEDICAL EMERGENCY OR DISASTER - USE GROUP CALLS
EXAMPLE: 5 or more injured, page 80 or 90 & all attendants will respond.....

****

MISCELLANEOUS PAGING ASSIGNMENT:

18-01 Rick Later, Sheriff
18-02 Mark Doering, Undersheriff
18-12 Tom Depew, Chief of Police
18-23 Marty Malesich
18-26 Stan Shafer, Pres. of Search & Rescue
18-28 Women's Resource Center
18-30 Bob Cottom, Water Dept.
18-40 R. Johnson, Civil Defense
18-41 LMC Security
18-42 LMC Security
18-43 Ken Brunkhorst - Coroner
18-44
18-50 Fran Weipper - Mental Health
18-62 Andre Morris, Air Ambulance
67

SKI PATROL:
18-190
18-191
18-192 Swede Troedsson
18-193
18-194
18-195
18-196
18-197
18-198
18-199

ROAD DEPARTMENT:
18-200 Bob Miller (District #1)
18-201 Jim Nettik, Foreman
18-203 Dillon Maintaince (District #1)
18-204 Dillon Snow Plow
18-205
18-206
18-207
18-208
18-209
18-210
18-211 Joe Clemans, Foreman
18-212 Jackson Snow Plow
18-213
18-214
18-215
18-216 Do Not Assign
18-217
18-218
18-219
18-220 Do Not Assign
18-221 Jim Barrett, (District #3)
18-222 Do Not Assign
18-223 Neal Cherry, Foreman
18-224

MONTANA HIGHWAY PATROL:
143 Sgt. Barnett, Dillon
216 Frank Brown, Dillon
220 Harold Forsman, Dillon
222 Kerry Keyser, Ennis
269 C. Hecock, Three Forks
304 D. Schenk, W. Yellowstone
251 B. Dove, Whitehall
253 T. Anderson, Whitehall

LIVESTOCK INSPECTORS:
LS 516 Jack Ripley
LS 505 Lawrence Johnson, Helena
LS 514 Jerry Harrison, Missoula

FISH & GAME DEPT:
FG 31 Cpt. B. McKierman, Bozeman
FG 32 Ken Shears, W. Yellowstone
FG 34 G. Haughland
FG 36 Sarge Hoems
FG 35 Jim DeBoer, Sheridan
FG 39 M. Vook, Butte
FG 510 B. Kocher, Butte

AMBULANCE & MEDICAL:
* 18-250 Dillon Ambulance #1
* 18-251 Dillon Ambulance #2
* 18-252 Dillon Air Ambulance (Portable & Pager)
18-253 Horse Prairie QRU
* 18-254 Lima Ambulance
18-255 Jackson QRU
18-256
18-257 Wisdom Ambulance
18-258 Wise River QRU
18-259
18-260 thru 18-269 not assigned

FOREST SERVICE:
FS-5 USFS INV., Tom Kings

FEDERAL:
708 Agent Tom-Brown, Butte
711 Agent Gary Lincoln, Butte
729 Agent Hal Blomstrom

IMMIGRATION:
777 Bill Cumley, Helena

GVW MONTANA HIGHWAY PATROL:
GVW - 4 Frank Murphy, Helena
GVW - 9

MONTANA HIGHWAY MAINTANCE:
MHD - 358 Jack Brown

LOW BAND:

WAH 92	State	39.82 MHZ	F-1
KXK 427	State	39.82 MHZ	F-1
	Region	39.88 MHZ	F-2
	Local	39.94 MHZ	F-3
	Repeater	39.56 MHZ	F-4

COUNTY HIGH BAND:

KLV 872	Local	155.805 MHZ	F-1
WCU 966	Repeater	155.100 MHZ	F-2

BARRETT HOSPITAL:

KLV 873	Local	155.805 MHZ	F-1
WCU 966	Repeater	155.100 MHZ	F-2
KQF 612	Amb-Hosp.	155.280 MHZ	F-3
KQF 612	Hosp-Hosp.	155.340 MHZ	F-4

NOTE: Pagers will be assigned to EMT'S each month & rosters will be issued to various agencies to show which person has which pager (80 thru 98)

NOTE: Multiple of 10 digits (EX: 70, 80, 90) will be left open to facilitate paging the entire group.

OTHER STATION ON WAH 92 & KXK 427

LAW ENFORCEMENT:

#* 18-1 Rick Later (PAGER 01)
#* 18-2 Mark Doering (PAGER 02)
18-3 Greyson Phipps, Lima
18-4 M. J. Freeman, Wisdom
18-5 Keith Reeder (PAGER 81)
18-6 Ray Tash
18-7
18-8 City Police
18-9 City Police
18-10 City Police
18-11
18-12 Chief, Tom Depew (PAGER 12)
18-13
18-14
18-15

FIRE DEPARTMENT:

* 18-16 Fire Chief, Mike Cvetish
* 18-17 A/Chief, Ron Bergeson
* 18-18 Rural Truck #1
* 18-19 Rural Truck #2
* 18-20 Fireman (Group Call)
* 18-21 Tank Truck
18-22
* 18-23 City Truck #1
* 18-24 City Truck #2
* 18-25 City Truck #3
18-26
18-27
18-28
18-29
18-30
18-31
18-32
18-33 Lima Fire Truck #1
18-34 Lima Fire Truck #2
18-35 Lima Fire Truck #3

SPECIAL & MISCELLANEOUS:

18-36 Mayor Lynch
18-37 Assessor, Harold Peterson
18-38 Women's Resource Center (Pager only)
* 18-39 Bob Cottom & City Water Truck
18-40 Rodger Johnson (Pager only)
* 18-41 WMC Security
* 18-42 WMC Security
# 18-43 Coroner Brunkhorst (Also Pager)
18-44 Deputy Coroner, Yuhasz
18-45 Lloyd Thomas, Brand Inspector
~~18-46 Vet. Gordon Knorr~~
18-47 ~~Vet. Wayne Nelson~~
~~18-48 Vet. Tom Williams~~
* 18-49 City Water Dept. Truck
18-50 Fran Weippert, Mental Health

18-51 thru 18-99 Open

- Equipped with Low Band Radio (WAH 92 & KXK 427)
* - Equipped with High Band Radio (KLV 872 & WCU 966)

COUNTY SCHOOL BUSES:

18-100 Reichle Bus (Glen
18-101 Bus #1 (Highway 41)
18-102 Bus #2 (Anderson & Schuler Lane
18-103 Bus #3 (Lower Blacktail)
18-104 Bus #4 (EXTRA)
18-105 Bus #5 (Ibeyville)
18-106 Bus #6 (Webster Lane)
18-107 Bus #7 (Melrose)
* 18-108 Bus #8 (Upper Blacktail)
18-109 Bus #9 (Shady Nook)
18-110 Bus #10 (Lakner Lane)
* 18-111 Bus #11 (EXTRA)
18-112 Bus #12 (Argenta)
18-113
* 18-114 Bus #14 (Wisdom)
18-115 Bus #15 (EXTRA)
18-116 Bus #16 (Grant)
18-117
* 18-118 Bus # (Sheep Creek)
* 18-119 Bus # (Lima to Dell)

SEARCH & RESCUE:

*KLV 872 CHANNEL 1
WCU 966 CHANNEL 2

		H/P	B/ph
18-1	Rick Later	4808	2383
18-2	Mark Doering	2783	2383
18-3	Greyson Phipps	276-3311	2383
18-4	M.J. Freeman	689-2395	2383
18-5	Keith Reeder	5092	2383
18-6			
18-120	2 1/2 Ton Truck		
18-121	3/4 Ton Truck		
18-123	Marty Malesich	2777	2892
18-124	Chuck Bornhauser	4406	2373
18-125	Al Kajin	5425	
18-126	Stan Shafer	5358	2223
18-127	Mike Shafer	5384	5561
18-128	Chris Kraft	4977	
18-129	Harvey Lake	4514	4588
18-130	Jim Kajin	5535	2322
18-131	M. Stocker	2233	
18-132	Bob Anerson	5045	
18-134	Dave Mathson	6445	2371
18-135	Jim Watkins	5305	2308
18-136	Val Prophet	5331	2368
18-137	D. Franks	4789	4844
18-138	Ted Pinkerton	6331	2110
18-139	Glen Nicholas	5324	
18-140	Rodger Johnson	5800	5321
18-141			
18-142	Paul Pilgrim	4093	2801
18-144	Lee Phillips		
18-145	Jack Stewart	5693	2333
18-146	A. Madsen	5889	
18-192	Swede Troedsson	4510	2312

CIVIL DEFENSE:

18-140	Rodger Johnson	5800	5321

18-151 thru 18-199 Open

Search + Rescue
Dispatcher

3-2223 Stan Shafer 3-5358
18-126

3-5561 Mike Shafer 3-5384
18-127 Page 26

3-2892 Marty Malsich 3-2777
18-123 Pager 23

Jim Kajin
3-2322 3-5535
18-130

Harvey Lake
3-4588 3-4514
18-129

842-5781 Bob Anderson 3-5045
18-132

3-2268 Jim Watkins 3-5305
18-135

3-2333 3-4977
Chris Kraft 18-128

3-2372 3-4406
Chuck Bornhauser 18-124

3-4236 3-2037
Dick Achter 18-141

3-5321 3-5800
Rodger Johnson 18-140

3-2368 3-5331
Val Prophet 18-136

3-2371 3-6445
Dave Mathson 18-134

3-2205 3-4877
Parke Scott 18-125

3-5324 3-5324
Glen Nicholas 18-139

3-6290 3-2233
Zeke Stocker 18-131

3- 3-5040
Lee Phillips 18-144

3-4844 3-4789
Doug Frank 18-137

3-5889
Al Madsen 18-146

3-2333 3-5693
Jack Stewart 18-145

3-2383 3-4808
Rick Later 18-1 Pager 01

3-2383 3-2783
Mark Doering 18-2 Pager 02

276-3311 276-3511
Greyson Phipps 18-3

689-2395 689-2397
M. J. Freeman 18-4

3-2383 3-5092
Keith Reeder 18-5

JERRY'S FINDING ON
BEAVERHEAD

ATTACHMENT (10)

FORM 1

LAND/MOBILE SYSTEM DESCRIPTION

o GENERAL INFORMATION

Agency Beaverhead County E.M.S. Corporation

Agency function (i. e. law inforcement,....) Emergency Medical Care in Beaverhead County, with mutual aid to adjoining counties

Address 309 West Reeder Dillon, Montana

Telephone 683-2833 (Business) 683-2332 (Emergency)

Manager/Communications Keith Reeder

Communications Engineer/Planner/Technician Harvey Lake

Other key personal:

Gale Murray, President
Nils Thomson, Vice-President
Art Hall, Treasurer
Evelyn Piazzola, Treasurer

Attach drawing or map which provides a geographical description of the radio system area.

o Identify each system radio site as follows:

○ - Base station site

△ - Control point site

◬ - Base station and control point site

o Number and prepare a Form 2 for each site.

o Does the system have any Mobile/Vehicle equipment?

Yes [X] No [ ] If yes complete Form 7

o Does the system have any Personal/Portable/Pager equipment?

Yes [X] No [ ] If yes complete Form 8 and attach

SITE IDENTIFICATION AND DESCRIPTION

Date 5/7/81

Organization Beaverhead County Law Enforcemnet Center

Site # 1 Type of site Dispatch

Address and/or landmark Courthouse, Bannack Street, Dillon, Montana

Latitude (degrees, minutes, seconds) 45° 12' 57"

Longitude (degrees, minutes, seconds) 112° 37' 29"

Ground height above mean sea level (feet) 5100'

1. Does the site have base station equipment?

   Yes [X] No [ ] If yes complete Form 4 for each basestation and attach.

2. Does the site have radio control points?

   Yes [X] No [ ] If yes complete a Form 5 and attach.

3. Does the site have one or more towers?

   Yes [X] No [ ] If yes complete a Form 3 for each site tower and attach.

4. Does the site have provisions for emergency power?

   Yes [X] No [ ] If yes complete Form 6 and attach.

5. Site Description

   Prepare a sketch of the site and use the above data to identify and cross reference the towers, antenna, base station number, and so on.

   Include: Site Ownership Beaverhead County

   Shared use Yes [X] No [ ]

   Site access road condition Paved

   Type of structure Concrete

   Size of structure 100' x 100'

   Room for expansion (within existing structure)
   Yes [X] No [ ]

   Planned site changes? (Explain)

FORM 3

SITE TOWER DATA

Tower # 1 Located on site # 1

Manufacturer Rohn - 50' Type/Model

Tower Height

Ownership Beaverhead County

Guyed Yes [X] No [ ] at eves, 20' level

Windload (pounds per sq. feet) unknown

Type of lighting None Painted N/A (Galvanized)

Type of lighting switch (manual, automatic) N/A

Location of antenna(s) on tower (provide sketch and number each antenna)

Name of nearby airport Beaverhead County Airport

Distance (feet) 26,400' Direction N.E.

History of lighting damage? Yes [ ] No [X]
If yes explain (grounding, soil, type,...)

Tower Sketch

See Attached

FORM 4

BASE STATION AND ANTENNA DATA

Base Station # 1 Located at Site # 1

Manufacturer Motorola Model L43BBB1190DM S/N 28011CC0042

Power 45 Watt No of Channels 4 Age 3 yrs Cost [illegible] $3500

Inventory No. _____ Modulation 20F3

Purchased with grant funds? Yes ☐ No ☒

Indicate if LEAA, HEW, DOT, DCPA, or other agency funding _____

Function/Operational use County High baud repeater system

Maintenance history Nothing exceptional

Channel Designator	F_1	F_2		
FCC Call Sign	KLV872	WCU966		
Simplex/Duplex	Simplex	Simplex		
Frequency: Base	155.805	155.100		
Base Rec	155.805	155.805		
Tone Squelch Type	No	No		
Frequency TX				
Rec				
Control Methods(s) Local	Local	Local		
Wireline				
Radio				
Repeater				
Control point site(s) & number				
Mobiles on Channel	EMS - 3	Others 40+		
Portables on Channel	EMS -10	Others - ?		

Antenna # 1 (See Form ~~12~~ 3) Located on tower # 1

Manufacturer Phelps Dodge Model _____

Gain (Decibels) 0 D.B. Type Quarter wave base

Height above ground (feet) 35' Total height above mean sea level 5135 '

Directional Yes ☐ No ☒ Omni

If yes state direction _____

Wind Load (pounds per square foot) Unknown

Propagation data available Yes ☐ No ☐ ?

Studies
User Information Key people

Transmission Line Data:

Manufacturer _____ Model RG8

Size 3/8" Type Jacked Coax

Length (feet) 100' Type connector PL259

may use form to show cavities, filters None

FORM 5

CONTROL POINT DATA

Site # 1

Control Point #	1	2	3		
Function (Police, H/W...) Control point for: o Base Station # o Located at site #	WAH92 Pipe Organ	KXK427 Maurer	KLV872 Maurer		
Control Equipment Description o Full console o Desk top consule o Desk set o Hand set o Other (Explain)	Full Console		DC Consolette		
Control Equipment Type o Local o Remote o Radio o Repeater	Radio				
Control Equipment Mode o DC o Tone o DC/Tone o Other	DC				
Manufacturer o Model # o S/N o Inventory # o Age o Maximum Cont. o Chan. Available	Motorola Modcom 5 Years		Motorola L43BBB190DM		

Control Point(s) Description

o Sketch the present dispatch area facility to include:

1) dimension
2) equipment location
3) air conditioning? Yes [X] No [ ] Type _____
4) physical security? Yes [X] No [ ]
5) status board used? Yes [ ] No [X] Type _____
6) logging recorder? Yes [ ] No [X]
   o Model _____
   o No. of channels _____ In use _____
7) time stamp used? Yes [ ] No [X] Type _____

Planned Modification/Expansion (i.e. computer aided dispatch, new console,...) Explain.

FORM 6

EMERGENCY POWER EQUIPMENT

Describe the type of emergency power equipment used ONAN 30 SK Model# 30 OSK 3R/9447A

Electrical capacity (kilowatts) 37.5

Automatic start and load transfer Yes [ ] No [X]

Describe the type of fuel and the storage system Gasoline

Does the fuel storage system meet fire regulations and other safety standards? Yes [X] No [ ]

Is the power equipment in a separate room from the communication gear? Yes [X] No [ ]

If no, are there any electrical interference, corrosion, vibration, or heat problems? Yes [X] No [ ]

Describe the cooling and ventilation facilities located outside (has engine heater)

Is the emergency power equipment run and checked periodically? Yes [X] No [ ]

If yes, is a log of the test kept? Yes [X] No [ ]

Is a battery float system used? Yes [X] No [ ]

If yes, what is the voltage? 130 V

Amphr capacity?

SITE IDENTIFICATION AND DESCRIPTION

Date 5/7/81

Organization Barrett Hospital

Site # 2 Type of site Hospital base station - Medical Control

Address and/or landmark 1260 S. Atlantic Dillon, Montana

Latitude (degrees, minutes, seconds) 45° 12' 28"

Longitude (degrees, minutes, seconds) 112° 38' 17"

Ground height above mean sea level (feet) 5120

1. Does the site have base station equipment?

   Yes [X] No [ ] If yes complete Form 4 for each basestation and attach.

2. Does the site have radio control points?

   Yes [X] No [ ] If yes complete a Form 5 and attach.

3. Does the site have one or more towers?

   Yes [X] No [ ] If yes complete a Form 3 for each site tower and attach.

4. Does the site have provisions for emergency power?

   Yes [X] No [ ] If yes complete Form 6 and attach.

5. Site Description

   Prepare a sketch of the site and use the above data to identify and cross reference the towers, antenna, base station number, and so on.

   Include: Site Ownership Barrett Hospital

   Shared use Yes [ ] No [X]

   Site access road condition Paved

   Type of structure Brick

   Size of structure 50' x 100'

   Room for expansion (within existing structure)
   Yes [X] No [ ]

   Planned site changes? (Explain)

FORM 3

SITE TOWER DATA

Tower # 1 Located on site # 2

Manufacturer Rohn - 25' Type/Model

tower Plant

Ownership Beaverhead County

Guyed Yes [X] No [ ] Anchored to Building at 12'

Windload (pounds per sq. feet) Unknown

Type of lighting None Painted N/A (Galvanized)

Type of lighting switch (manual, automatic) N/A

Location of antenna(s) on tower (provide sketch and number each antenna)

Name of nearby airport Beaverhead County Airport

Distance (feet) 29,040 Direction N.E.

History of lighting damage? Yes [ ] No [X]
If yes explain (grounding, soil, type,...)

Tower Sketch

See Attached

FORM 4

BASE STATION AND ANTENNA DATA

Base Station # 1 Located at Site # 2

Manufacturer Motorola Model L43BBB1190DM S/N 280HBG0064

Power 45 Watt No of Channels 4 Age 3 years Cost ~~$~~$1200

Inventory No. _____ Modulation 20F3

Purchased with grant funds? Yes ☐ No ☒

Indicate if LEAA, HEW, DOT, DCPA, or other agency funding _____

Function/Operational use Medical Control for field ambulance

Maintenance history No exceptional

Channel Designator	1	2	3	4
FCC Call Sign	KLV873	WCU 968	KQF 612	KUF 612
Simplex/Duplex	Simplex	Simplex	Simplex	Simplex
Frequency: Base	155.805	155.100	155.280	155.340
Base Rec	155.805	155.805	155.280	155.340
Tone Squelch Type	DTMF	DTMF	DTMF	DTMF
Frequency TX				
Rec				
Control Methods(s)				
Local	Local	Local	Local	Local
Wireline				
Radio				
Repeater				
Control point site(s) & number				
Mobiles on Channel				
Portables on Channel				

Antenna # 1 (See Form ~~12~~ 3) Located on tower # 1

Manufacturer Andrew Model 161-1

Gain (Decibels) 3 D.B. Type Omni

Height above ground (feet) 20' Total height above mean sea level 5146'

Directional Yes ☐ No ☒

If yes state direction _____

Wind Load (pounds per square foot) Unknown

Propagation data available Yes ☐ No ☐ ?

Studies
User Information Key people

Transmission Line Data:

Manufacturer _____ Model RG8

Size 3/8" Type Foam Filled

Length (feet) 100' Type connector PL259

may use [illegible] to show [illegible], [illegible] None

FORM 5

BLANK DUE TO CONFUSION ON THIS FORM

CONTROL POINT DATA

Site #_____

Control Point #					
Function (Police, H/W...) Control point for: o Base Station # o Located at site #					
Control Equipment Description o Full console o Desk top console o Desk set o Hand set o Other (Explain)					
Control Equipment Type o Local o Remote o Radio o Repeater					
Control Equipment Mode o DC o Tone o DC/Tone o Other					
Manufacturer o Model # o S/N o Inventory # o Age o Maximum Cont. o Chan. Available					

Control Point(s) Description

o Sketch the present dispatch area facility to include:

1) dimension
2) equipment location
3) air conditioning? Yes [ ] No [ ] Type _____
4) physical security? Yes [ ] No [ ]
5) status board used? Yes [ ] No [ ] Type _____
6) logging recorder? Yes [ ] No [ ]
   o Model _____
   o No. of channels _____ In use _____
7) time stamp used? Yes [ ] No [ ] Type _____

Planned Modification/Expansion (i.e. computer aided dispatch, new console,...) Explain.

FORM 6

EMERGENCY POWER EQUIPMENT

Describe the type of emergency power equipment used ONAN 45 EM Model # 45 OEM - 15 B/9388G

Electrical capacity (kilowatts) 45 KW

Automatic start and load transfer Yes ☐ No ☒

Describe the type of fuel and the storage system LPG

Does the fuel storage system meet fire regulations and other safety standards? Yes ☒ No ☐

Is the power equipment in a separate room from the communication gear? Yes ☒ No ☐

If no, are there any electrical interference, corrosion, vibration, or heat problems? Yes ☒ No ☐

Describe the cooling and ventilation facilities

Is the emergency power equipment run and checked periodically? Yes ☒ No ☐

If yes, is a log of the test kept? Yes ☒ No ☐

Is a battery float system used? Yes ☒ No ☐

If yes, what is the voltage? 50 KVA

Amphr capacity?

FORM 2

SITE IDENTIFICATION AND DESCRIPTION

Date 5-9-81

Organization Highway Patrol - Wisdom

Site # 3 Type of site Law Enforcement - Ambulance Dispatch

Address and/or landmark Mobile Home east end of town

Latitude (degrees, minutes, seconds) 45° 36' 40" N.

Longitude (degrees, minutes, seconds) 113° 26' 20"

Ground height above mean sea level (feet) 6050

1. Does the site have base station equipment?

   Yes [X] non-E.M.S. No [ ] If yes complete Form 4 for each basestation and attach.

2. Does the site have radio control points?

   Yes [ ] No [X] If yes complete a Form 5 and attach.

3. Does the site have one or more towers?

   Yes [X] No [ ] If yes complete a Form 3 for each site tower and attach.

4. Does the site have provisions for emergency power?

   Yes [ ] No [X] If yes complete Form 6 and attach.

5. Site Description

   Prepare a sketch of the site and use the above data to identify and cross reference the towers, antenna, base station number, and so on.

   Include: Site Ownership Highway Patrol

   Shared use Yes [ ] No [X]

   Site access road condition Paved to dirt driveway

   Type of structure Mobile Home

   Size of structure 12' x 60'

   Room for expansion (within existing structure)
   Yes [ ] No [X]

   Planned site changes? (Explain)

FORM 3

SITE TOWER DATA

Tower # 1 Located on site # 3

Manufacturer Phone pole Type/Model

Tower Right

Ownership

Guyed Yes [X] No [ ]

Windload (pounds per sq. feet)

Type of lighting None Painted No

Type of lighting switch (manual, automatic) N/A

Location of antenna(s) on tower (provide sketch and number each antenna)

Name of nearby airport

Distance (feet) Direction

History of lighting damage? Yes [ ] No [ ]
If yes explain (grounding, soil, type,...)

Tower Sketch

FORM 4

BASE STATION AND ANTENNA DATA

Base Station # 1 Located at Site # 3

Manufacturer Motorola Model L71BBB3490AM S/N SOL519

Power 100 Watt. No of Channels 4 Age 2 yrs. Cost

Inventory No. Modulation

Purchased with grant funds? Yes ☐ No ☐

Indicate if LEAA, HEW, DOT, DCPA, or other agency funding

Function/Operational use Law Enforcement

Maintenance history

Channel Designator	1	2	3	4
FCC Call Sign	KUU555			
Simplex/Duplex	Simplex	Simplex	Simplex	Simplex
Frequency: Base	39.56	39.82	39.38	39.94
Base Rec	39.56	39.82	39.88	39.94
Tone Squelch type	No	NO	No	No
Frequency TX				
Rec				
Control Methods(s)				
Local				
Wireline				
Radio				
Repeater				
Control point site(s) & number				
Mobiles on Channel				
Portables on Channel				

Antenna # 1 (See Form ~~12~~ 3) Located on tower # 1

Manufacturer Phelps-Dodge Model

Gain (Decibels) Type

Height above ground (feet) 60' Total height above mean sea level 6110'

Personal/Portable Equipment

Identification Number	Item	Quantity	Manu	Model	Power	Channel Frequency 1 - 4	5 - 8	9-12	13-16	Age	Tone Squelch	Acqui. Date	Cost
Dillon Amb 230ACW1046	1	1	Motorola	H3BBU 1144A	5 Watt	155.805 155.100 155.280 155.340				3yrs.	NO	1978	~$650
Dillon Amb 230ACW1064	2	1	Motorola	H3BBU 1144A	5 Watt	155.805 155.100 155.280 155.340				1 Yr	NO	1980	
Dillon Amb 527ACD10112	3	1	Motorola	SP2728 421	5 Watt	155.805 155.100 155.220 155.280				1 Yr	NO	1980	
Dillon Amb. 605100280220	4	1	Motorola	H3BBU 1144A	5 Watt	155.805 155.100 155.280 155.220				1 Yr	No	1980	
Dillon Amb. 230ACW0277	5	1	Motorola	H3BBU 1144A	5 Watt	155.805 155.100 155.220				1 Yr	No	1980	
Dillon Amb 230ACW0379	6	1	Motorola	H3BBU 1144A	5 Watt	155.805 155.100 155.220				1 YR	No	1980	
Dillon Amb (checked out at time of survey)	7	1	Motorola	H3BBU 1144A	5 Watt	155.805 155.100 155.280 155.220				1 YR	No	1980	
Three additional units are being purchased for the Wise River, Jackson, and Grant CRU's of the same model and configuration as item 7.													

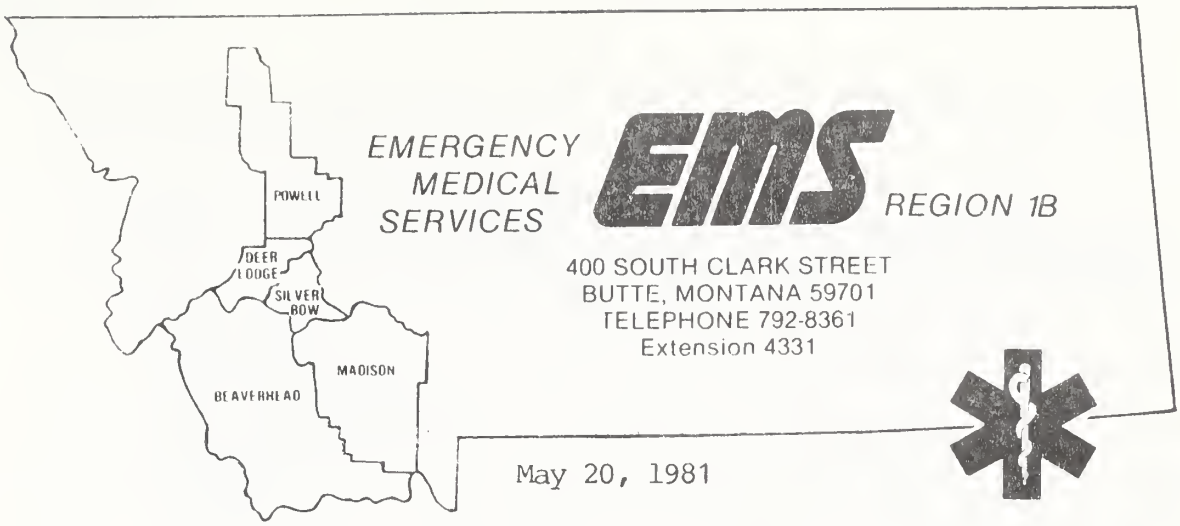
Also available in Dillon are 16 Moden-100 pagers for the ambulance and 9 Moden-100 pagers for the Hospital. - Location and specifics unavailable at time of survey.

FORM 7

MOBILE EQUIPMENT

Identification Number	Item	Quantity	Manu	Model	Power	Channel Frequency 1 - 4	5 - 8	9-12	13-16	Age	Tone Squelch	Acqui. Date	Cost
Dillon Amb. 18250 H160J	1	1	Motorola	T73RTN 1190B	100 Watt	39.82				5 Yrs	No	1976	$700
Dillon Amb. 18250 [illegible]	2	1	Motorola	T71BB A2900CA	100Watt	.805 .100 .280				5 Yrs.	NO	1976	$2000
Dillon Amb. 18250	3	1	Pace	CB 144	5 Watt								
Dillon Amb 18211 [illegible]	4	1	Motorola	U51HHT 1000A	100 Watt	39.82				20 Yrs			
Dillon Amb 18251	5	1	Cobra	28	5 Watt								
Lima Ambulance	6	1	Motorola	T71BB A2900CA	100 Watt	.805 .100 .280				2 Yrs			
Wisdom Amb 7081406	7	1	GE	Mastr II MC76KAS 66A	100 Watt	39.82				3 Yrs			
Wisdom Amb [illegible]-67098	8		Motorola	CC1038	100 Watt	155.220				7 Yrs			

FORM 8



EMERGENCY MEDICAL SERVICES
EMS
REGION 1B
400 SOUTH CLARK STREET
BUTTE, MONTANA 59701
TELEPHONE 792-8361
Extension 4331

May 20, 1981

A.E. Clifford
Telecommunications Project
Room 227
Helena, MT 59601

Dear Cliff:

Please accept the following as a summation of my experience with the "Land/Mobile System Description" reporting form I was asked to evaluate April - May, 1981. It was my task to do a physical inventory of the E.M.S. Communications equipment capability in Beaverhead County. On this behalf I conducted a field survey lasting approximately 12 hours and covering over 350 miles. In this effort, I perceived myself simply as a gatherer of information, rather than an evaluator or technician, since I have had no formal education in either of these roles.

The following were noted as problems in this task:

1. System overlap -- i.e. a lack of definition to "system" parameters
2. Expertise, or lack of it, of interviewer and interviewee. It was evident that most Communications Managers do not fully understand the inner-workings of their system and that a great many systems have internal complexities that could only be understood by a communication engineer and then only if he had total access to the system.
3. Terminology
4. Enormity of task
5. Physical inaccessability of sites
6. Interpretation and practical utilization of data gathered, an explanation to local personnel.

Recommendation:

1. Revise and clarify the form -- it is basically a good tool, but effort must be made to gain common ground and eliminate vague terminology, including:
   a. Re-number forms to provide for better field utilization
      Form 1 Same
      Form 2 Same
      Form 3 Base Station Data
      Form 4 Radio Control Points
      Form 5 Tower and Antenna Data
      Form 6 Same
      Form 7 Same
      Form 8 Same

Utilizing this numbering system, the following recommendations are made for individual forms:

b. Form 1 -- Define parameters of "system" and "Lead agency"
c. Form -- OK, except for changes in form numbers
d. Form 3 -- Base station data - Clarify or eliminate the following terms:
   Inventory?
   Modulation?
   Maintenance hx?
   Tone Squelch Type?
   Control Methods?
   Cavities?
   Filters?
   Studies user information?
   Relocate the antenna and transmission line information to Form 5.
   Add a section for license information -- i.e. what frequencies and is it current?
   Re-evaluate need for cost questions- are they necessary and, if so, what justification is to be given local agencies?
e. Form 4 - Radio Control Points - Revise entire form to make understandable to lay-interviewer and interviewee.
f. Form 5 - Tower and Antenna Data - Eliminate "Gain", "Type", and "Wind Load" -- "Model" should provide this information.
   Include space for tower height.
   Provide diagram on Form of Rohn-Type Tower, which may be adjusted to various scales, allowing for rapid field expression of antenna and tower.
g. Form 6 -- OK
h. Form 7 -- Add a column designating the storage location of all portable/mobile equipment. Increase the space allowed for Model # and frequency designation.
i. Form 8 -- Include location data.

Due to the complexity of this information and the variability of technical language, a quick-reference explanation booklet for this entire form would greatly facilitate this process. In addition, the capability to readily program this data into a computer would make effective utilization more plausible. This, of course, would require radical format changes.

2. Assure consistency and credibility of interviewer and, as much as possible, interviewee. This would preclude any mailing of forms to be filled out by unknown individuals. The interviewer must be completely oriented to the needs and purpose of the form and be technically sophisticated enough to meet those needs. In addition, for the amount of time and effort involved, the interviewer must receive adequate compensation.
3. Realize the enormity of the task and commit sufficient resources to accomplish it in a reasonable time.
4. Do <u>all</u> high sites in August.

5. Identify specific goals and use for this data, hopefully providing enough motivation for local cooperation, recognizing the stress put on a system to gather this data. Even though the current effort was to evaluate a data-gathering methodology, if we cannot provide a reason for doing it, the effort will be rather limited and, as evidenced by this experience, meaningless.
6. Decide exactly what data is necessary to meet these goals and limit the form to that data.

I hope this presents some insight into my experience with this form. I do feel my lack of technical expertise was valuable in that it provided a mechanism to test the form in the least expensive way. If I had been successful in gathering the necessary infromation, it would have been a simple matter to circulate the form to each county agency. Since such is not the case, it is now apparent that the form must be dramatically revised or the interviewer must be technically sophisticated. My primary concern was the use to which this data could be put. For example, as an E.M.S. Administrator, if the results of this study could have expressed the perceived capabilities of this county vs. the existing capabilities vs. the recommended capabilities for this county, it would have been well worth my while to provide whatever assistance necessary in this task. This, of course, would require a great deal more interpretative capability on the part of your project. It would also provide a reason for doing all this work.

In closing, I would like to express my appreciation for the efforts you are making. This is indeed a necessary project and one which requires a great deal of organizational time and thought. Thank-you for this opportunity to help. Please call if I may be of any further assistance.

Respectfully Submitted,

JERRY

Gerald R. Decker
Regional Administrator

MONTANA PUBLIC TELEVISION

SIGNAL DISTRIBUTION ALTERNATIVES

June, 1981

by

Dr. Daniel N. March

INTRODUCTION Montana may be interested in establishing a Public Broadcasting Television Station. The signal from this station will have to be delivered to the people of Montana if it is to be of value. Most other states have PBS stations and delivery systems such that most residents in their state can receive the siganl. However, problems of delivering the TV signal to the people of the other states has not been as big a problem for them as it is in Montana. Montana has both a sparce population, relatively, and a large area. Montana cannot use a signal distribution criteria like, "A good signal will be present at every residence in the state if the signal is transmitted at 100 kilowatts from each city in the state with at least 100,000 people residing therein". Other states have successfully used such criteria. Montana needs to consider various technically feasible methods to deliver a TV signal to specific locations (generally cities) throughout the state and then the distribution of the signal to individual residences.

The purpose of this report is to provide a technical description, advantages and disadvantages, and relative costs of (A) systems to deliver the TV signal long distances throughout the state and (B) systems to deliver the signal to the residents. The long distance delivery systems to be investigated, per contract are terrestrial microwave systems and satellite systems while the home delivery systems to be considered are cable, high powered transmitters, and low powered transmitters. A variety of options using each of these combinations will be considered.

TERRESTRIAL MICROWAVE TELEVISION SIGNAL DISTRIBUTION

Basic Definitions

Terrestrial microwave systems use radio transmitters, repeaters, and receivers that are all located on the earth and each station must be able to "see" the next station. The particular radio frequencies used, generally between 2 GHz and 14 GHz ($2x10^9$ to $14x10^9$ Hertz), travel only in straight lines unless they are reflected. Thus two microwave sites must be line-of-sight, optically visible to each other. Exceptions to this occur when a reflecting surface for the radio signal has been installed between the two sites. Then signals can be transmitted between the two sites via the reflecting surface. The reflecting surfaces often look like billboards. There are several present in Montana.

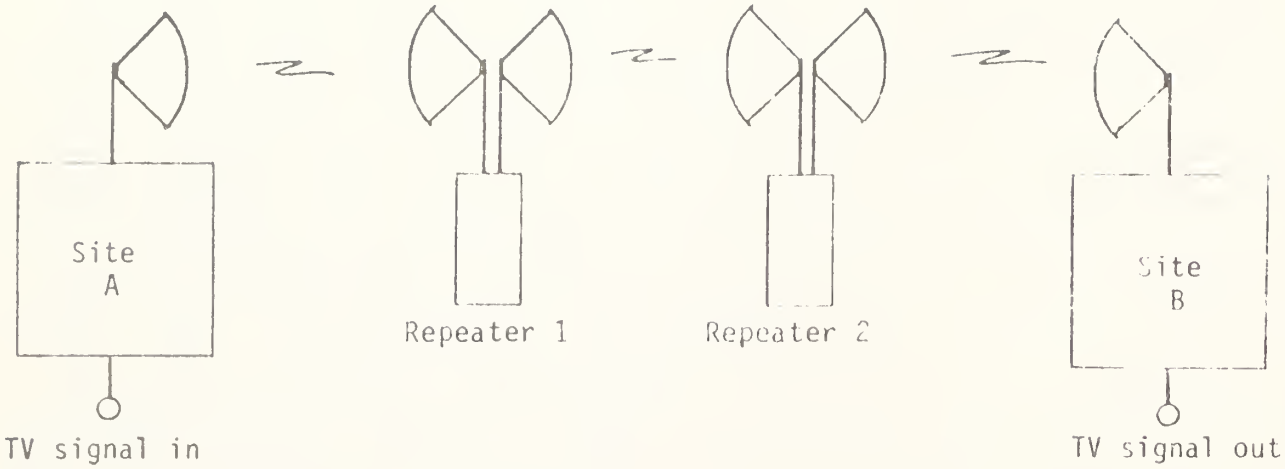


Figure 1. Block diagram of microwave communication link

Figure 1 shows a block diagram of a microwave communications link. Sites A and B are the terminals where signals may originate or terminate and there are two repeater sites. When the microwave link carries telephone communications, information must be able to travel in both directions. However, when TV signals are carried by a microwave system, the information signal need travel only in one direction. Assume a TV signal is present at site A and it is desired at site B. The TV signal, which is a low frequency signal relative to the microwave frequency, has to be translated in frequency to the microwave frequency. This translation is generally called modulation. The microwave signal will contain the TV signal either in changes in its amplitude or as changes in its frequency. The TV signal, when translated to the microwave frequency region, is no longer receivable on a standard TV receiver. However, a microwave receiver can translate the TV signal back to a frequency that can be received by a standard TV set. Thus, in figure 1 site A will have a TV signal input but its output will be the modulated microwave frequency. Repeater number 1 will receive the microwave frequency from site A and will translate the received microwave frequency a small amount and will then retransmit the new frequency signal to the next repeater. The slight

frequency change was required as a site should not receive and transmit on the same frequency because the receiver generally "hears" only its own transmitter in such cases. The microwave signal then propagates to repeater number 2 where it is again received, translated slightly in frequency, and retransmitted to site B. At site B the microwave signal is received, demodulated (translated in frequency to a desired TV channel) and is then available for further distribution. The output from the site B microwave station is in the form of a voltage on a coaxial cable . If a TV set were at the site the coaxial cable could be used as the signal source for the TV set and a picture with audio would be present. However, there is not necessarily a TV transmitter at the site nor cables to other receivers. The problem of getting the TV signal from the microwave site to residences is considered later in this report.

The distance apart that the repeaters can be spaced is a function of the microwave frequency used and the local terraine. The lower the microwave frequency that is used, the farther apart the repeaters can be because the microwave signal attenuation per mile increases as frequency increases. A 2 GHz microwave system can be expected to have repeaters spaced 30 to 35 miles apart while a 6 GHz system will need repeaters every 25 to 30 miles.

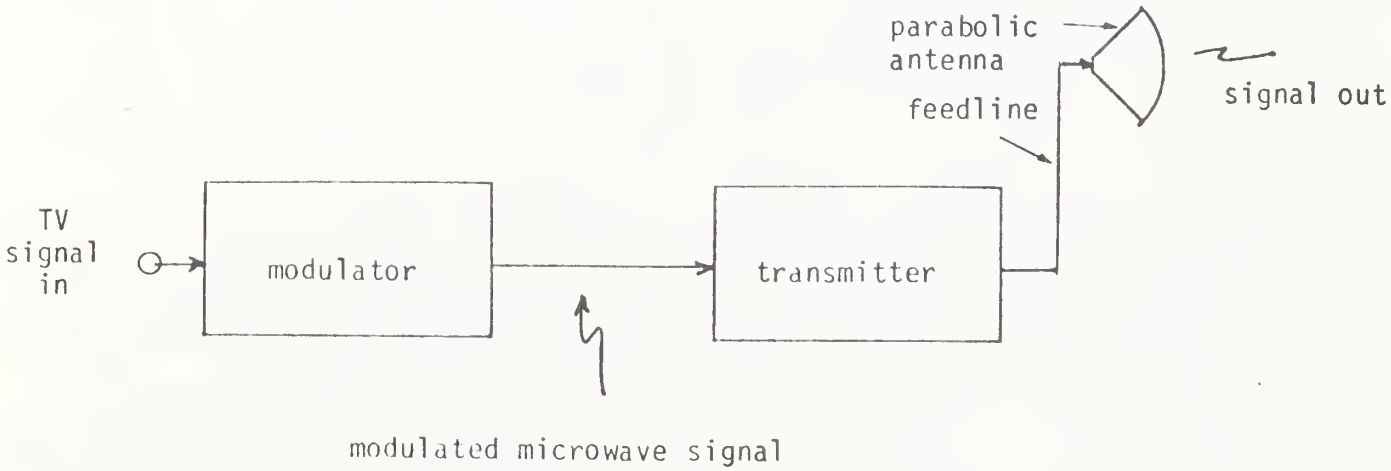


Figure 2. Block diagram of original transmitting terminal

Parabolic dish antennas are generally used for receiving and transmitting at microwave sites. The parabolic antenna focuses the microwave radio signal so that most of its energy goes in one direction. The results are much like that of a search light. In fact, the aircraft search lights used in the Second World War had parabolic reflectors. Figure 2 shows the block diagram of equipment needed at the terminal where a TV signal originates on a microwave system. The TV signal modulates a microwave signal in the modulator. This signal feeds the transmitter which amplifies the signal to the level to be transmitted. This signal in turn passes through a feed line, coaxial cable or waveguide, to the antenna. At the antenna the microwave signal is directed to the first receiving site.

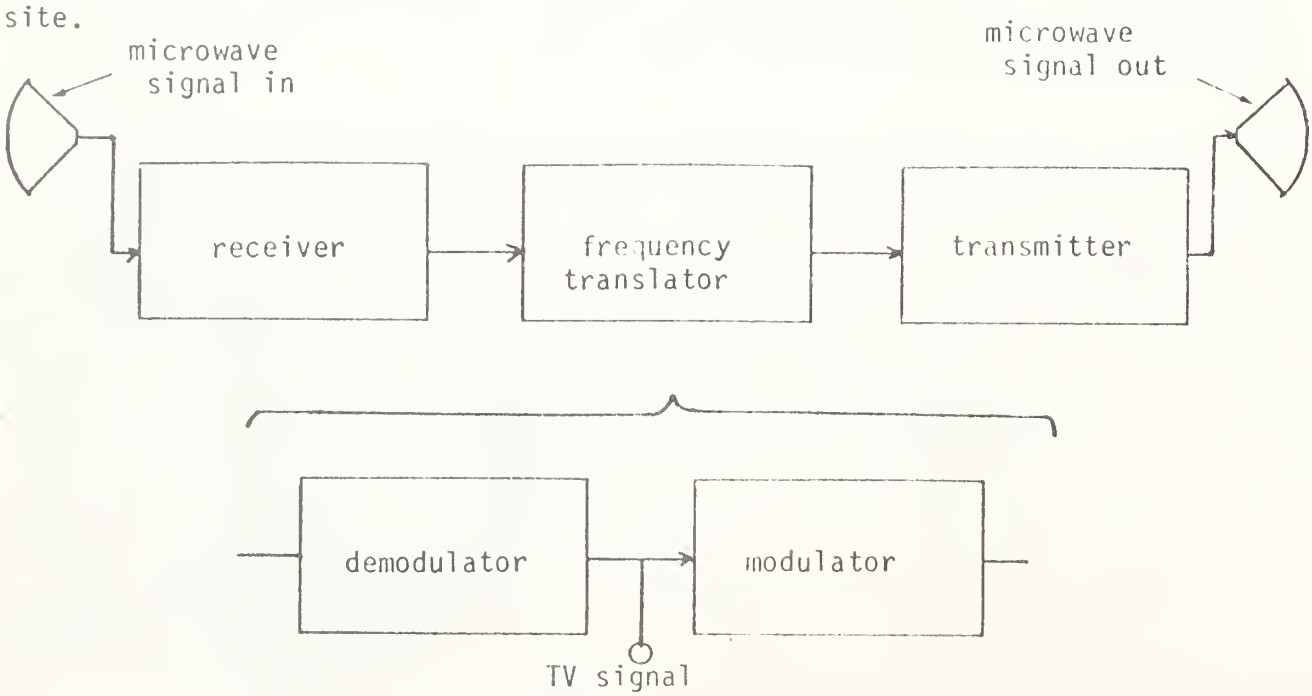


Figure 3. Repeater site block diagram

Figure 3 shows a block diagram of the equipment at a repeater site. The microwave signal is received by the antenna and passes through a feed line to the receiver. The signal out of the receiver can then be processed in either of two ways, as shown in the diagram. The signal can simple be translated in frequency and retransmitted. Some equipment manufacturers take the signal from the receiver and demodulate it so that the original TV signal is available. Then, in normal operation, the demodulated signal is used to modulate another microwave signal which in turn is transmitted. This process is also shown in figure 3. With this latter process there are several advantages. One advantage

is that the demodulated signal quality can be checked, like on a TV set. Also the demodulated signal may be used elsewhere at the site. For example a low powered television transmitter could be operated at the site. Finally, there is the possibility of adding control signals or monitor signals to the demodulated signal prior to remodulation. This allows a small amount of local information to be added to the microwave output of the site so that it could be observed at a nearby city that had a microwave terminal in it.

Figure 4 shows a block diagram of a receiving terminal. Such a site has no need to retransmit the signal. Generally such a terminal would be in a city or town or at a television transmitting site. The output of the microwave receiving terminal would be the TV signal, again in the form of a voltage at some output terminals.

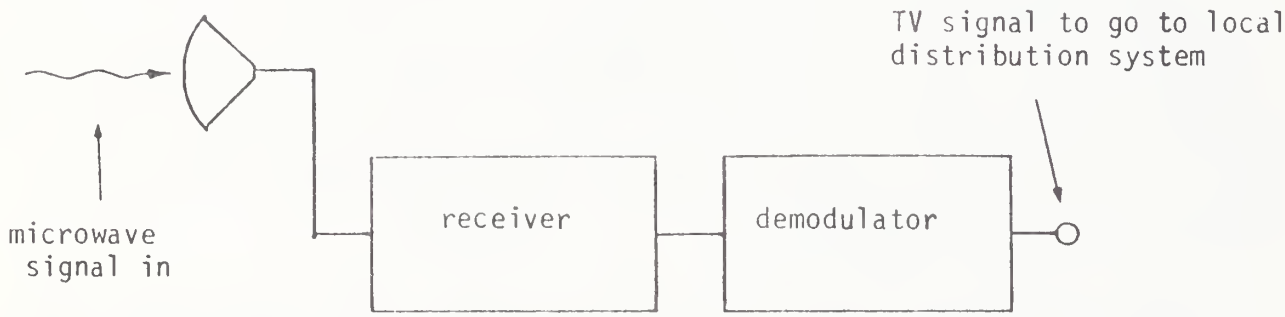


Figure 4. Block diagram of receiving terminal

SYSTEM DESIGN Now, the various types of microwave terminal sites and repeaters can be used in block diagram form to lay out communication systems. An example will be shown. In this example a microwave originating terminal is at a television studio. The studio will probably be receiving many national programs via microwave as most Montana TV stations presently do. The studio may also be getting signals from a satellite via an earth station. Then, too, some programs will have been prepared elsewhere and reproduced at the studio via video recording and some programs may originate at the studio. Events can also be presented

live from their locations not near the studio via temporary microwave paths between the event location and the studio. The signal from the studio is the signal that is to be delivered to various sites via microwave for distribution to residences. Microwave communication systems may be leaving the studio in more than one direction.

Figure 5 shows a segment of a microwave communication link with several options of system configuration. The studio is shown on the left hand side. Two microwave communication links are shown leaving the studio. One could be going east while the other goes west. There could be other microwave links leaving the studio. Not all of the microwave links necessarily have to have the same TV signal. For example, some programs that might be of significant interest to Western Montana might be of little interest to Eastern Montana and vice versa. With the microwave communication system, it is feasible to show different programs to different areas of the state. There can also be more than one studio present in the microwave system. One studio could be in Western Montana and one could be in Eastern Montana. If a two way microwave system were present between the two stations, part of the time both stations could use the same programs, part of the time they could both use seperate programs, and both could use programs originating at either terminal.

The microwave link leaving the studio on the right hand side would feed a series of repeaters. One or more of these repeaters could have the demodulated microwave signal, actually the TV signal available for a low powered TV transmitter. This unit, probably a 100 watt transmitter, would be unmanned and would provide a usable TV signal to some rural area. The microwave repeater site is likely to be at a high elevation and have electrical power present. The TV coverage from such a site can be significant. More details about low-powered TV transmitters will be presented later in this report.

Another microwave repeater is shown in figure 5 after the repeater with the unmanned low-powered TV transmitter. Then a repeater station is shown with two outputs, i.e. the signal is retransmitted toward the top of the page and also toward the botton of the page. The link toward the botton of the page terminates in a receiving terminal. At the receiving terminal, probably at or near a large

city, the TV signal is used to feed a cable TV system serving the community and it is used to feed a high powered transmitter which must be manned by a qualified person (FCC rules). The microwave link going toward the top of the page goes through several repeaters until a small community is reached. At the small community a repeater is used which has the TV signal available for use. The signal is used to feed a cable system for the community and a low powered unmanned TV transmitter is present. The microwave signal is shown continuing past this repeater site.

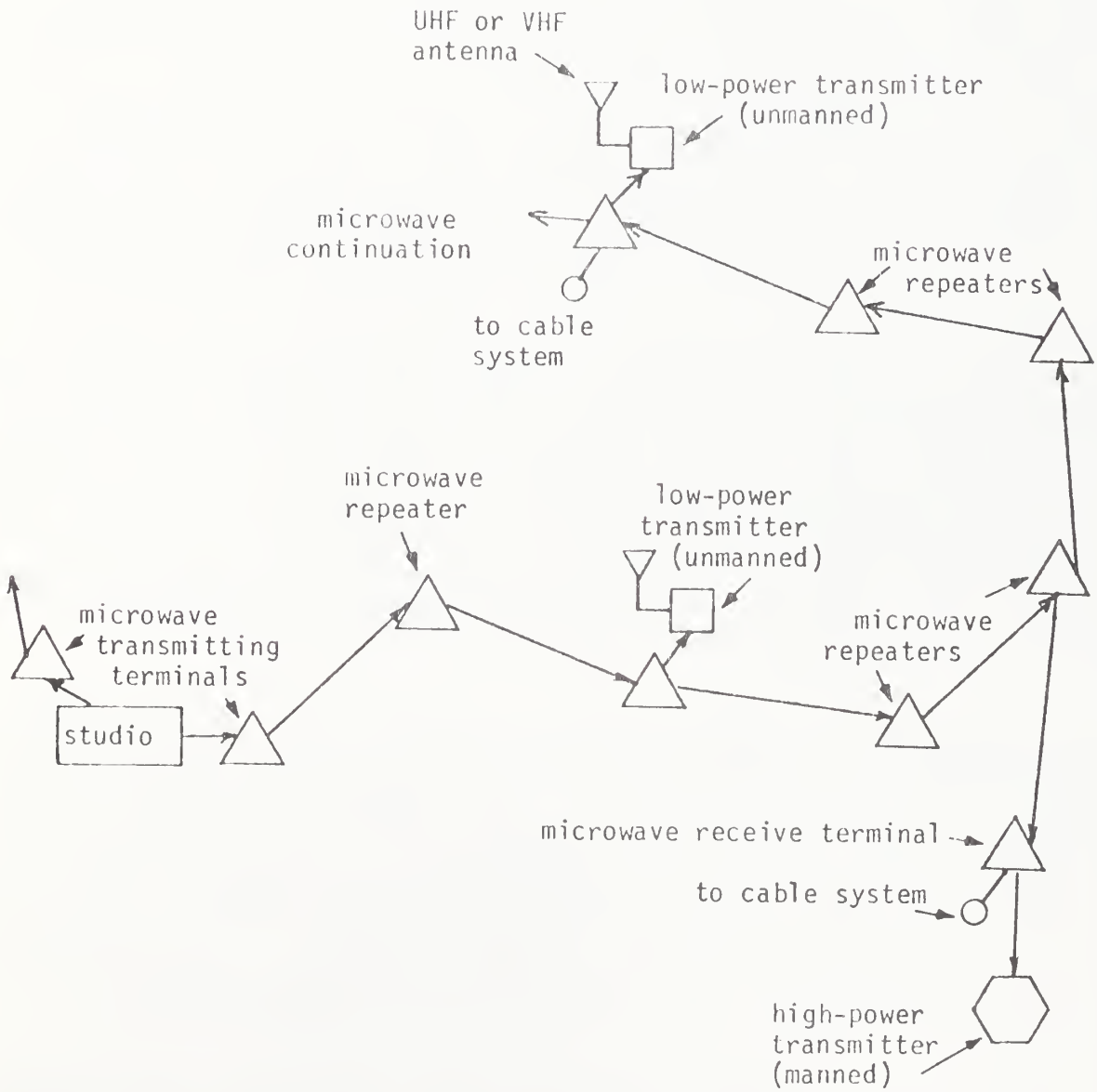


Figure 5. Block diagram of microwave system showing elements in possible lay-out.

A STATE OWNED MICROWAVE SYSTEM The State of Montana could design, build, and maintain a microwave system to transport the TV signal throughout Montana. The state could design its own system to serve exactly those sites it wanted. The quality of the TV signal should be broadcast quality (excellent) anywhere it is taken off the microwave system. Another factor to consider is that the state might want a microwave system for state use other than TV (i.e. voice communications, data transfer, facsimile, highway patrol dispatching, etc.). The need for such a system was investigated by McLeod and March[1] in 1973. The results of that investigation showed that, at the expected levels of state usage, GSA Telpak lines, communication channels which were available between various points and which were rented at reduced rates from the federal General Services Administration, were economically more feasible. The data that that decision was based upon may have changed significantly by 1981. Perhaps a re-evaluation in 1981, especially considering a PBS TV signal, would change the conclusions relative to a state owned microwave system. In this report pertinent details and costs relative to microwave communication systems to carry a TV signal will be given in general terms. A microwave system design to carry a TV signal throughout Montana is beyond the scope of this report and, in fact, a particular criteria to use for such a design is beyond the scope of this report. Examples of such criteria might be for the microwave signal carrying the TV signal to be delivered to each community with more than 4000 people in it (1980 census) or maybe the signal should be present in each county seat or maybe the signal should be delivered to only a few high powered TV transmitters.

A state owned microwave system to carry a TV signal will probably operate in the 6 GHz band due to Federal Communication Commission, FCC, rules and equipment availability. Repeaters in this band can be spaced 30 to 35 miles apart in friendly terraine but, a microwave system designer has told the author to plan on a 25 mile spacing for the distance between average repeaters. Then to transmit a TV signal, via microwave, between Helena and Bozeman, a distance of 107 miles, would probably require the two terminals and three repeaters.

The electronics for a standard repeater station, which will include antennas, tower, transmit and receive capabilities, and a simple building, will cost

approximately $50,000. The state would be expected to provide the site, a road and electrical power to the site, initial leveling of the site, and the concrete work for the building and antenna tower. If standby electrical power were desired at the site, the state would have to install equipment to provide it. Installation of the microwave equipment would be done by the manufacturer. The author has had recent experience with microwave sites in Montana. Site acquisition, road right-of-way, power line construction, and initial site excavation are costly and time consuming. Often times the cost of these latter considerations exceed the cost of the microwave equipment. However, on the average the site considerations should be less, especially in Eastern Montana. One way to reduce these site costs is to share sites with other microwave systems. There are other microwave systems in the state and at least some of them would be pleased to consider site sharing (personal phone conversations). Mountain States Bell, Montana Power, Pacific Power and Light, Western Microwave, Burlington Northern, and Bonneville Power are among the Montana microwave users.

If a TV signal is desired at a repeater site for transmission over a 100 watt transmitter, another $5000 worth of electronic equipment is needed in the microwave station. This does not include the cost of the transmitter or antenna. Microwave terminal equipment where the TV signal is originally put on a microwave system and transmitted to the first repeater or where the signal terminates, cost approximately $35,000 per site. Again this cost does not include site costs. These terminal sites are likely to be in cities or towns.

A microwave link, capable of carrying the TV signal, between Helena and Bozeman is going to cost at least 2x $35,000 plus 2x $50,000 or $170,000 for the electronic communication equipment only. A link between Great Falls and Havre will cost at least $220,000 for the communication equipment. Remember that these costs do not include land, leveling, concrete work, road, right-of-way, and electrical power. If already developed sites are available, then a cost sharing agreement must be negotiated with the site user. Such sharing of sites is considered almost essential these days (the good microwave sites are already used). Generally such agreements involve an initial payment by the new site occupant to the original developer of the site to share development costs. A continuing contract agreement is made relative to road and power line maintenance and some-

times even snow plowing or joint maintenance trips to the site are considered.

If the state of Montana were to have a microwave communication system of its own for telephone, data, dispatching and other uses, then a valid question is "How much more would the site electronics cost if a TV signal were carried on the microwave system?". The answer is not complicated if the original communication system is operating at 6 GHz. The incremental additional cost of equipment to carry the TV signal is then in the range of $11,000 to $15,000 per site. The microwave signal that carries the TV signal shares the same antennas as the other microwave signals.

As stated earlier, a statewide microwave system design for carrying the TV signal throughout the state is beyond the scope of this report. However, there is a microwave system layout for a 2 GHz voice and data system for Montana in the McLeod and March[1] report. This system map is shown in Appendix A. Every city with a population of at least 4000 is covered if a terminal is added for Livingston and Laurel is considered with Billings. The number of repeaters needed on the system if 6 GHz were used with average repeater spacing of approximately 25 miles is 53, with 12 terminals. This gives coverage to all locations shown on the map (dashed line as well as solid line). Note that terminals, like the one at Lewistown, require all the equipment of a repeater because a seperate transmitter and antenna is needed from the nearby repeater station as well as the antenna and receiver at the receiving terminal. Thus terminal and repeater stations are both assigned $50,000 for microwave communication equipment. Then the initial cost of the microwave equipment only is 3.25 million dollars. That cost does not include system design, site acquisition, roads, right-of-way, power lines, site preparation, nor maintenance.

Another consideration is, again, what if the state wanted a 6 GHz system to cover the locations on the map for voice and data, then what would be the additional costs to carry a TV signal. Using $11,000 per station the additional cost is $715,000 for added microwave equipment.

A final consideration of a state owned microwave system involves maintenance.

A rule-of-thumb in the microwave industry is that maintenance costs for the microwave system will be approximately ten percent of the new equipment costs. Thus, if the original system costs were $3,250,000, one could expect maintenance costs to be $325,000 annually. Maintenance costs in mountainous terraine tend to be more expensive. Equipment manufacturers have pointed out that maintenance costs for a system with both TV and voice, data, etc. are excessively high if the voice, data, etc. link is digital rather than analog. A digital link converts all signals to binary data for transmission. An analog system transmits the signals in analog form (continuous signal). TV transmission presently is in the analog form. For ease of maintenance, the other transmissions, if present, should also use analog transmission. Then, too, a spare parts inventory and maintenance test equipment must be purchased.

TELEVISION DISTRIBUTION VIA COMMON CARRIERS

Mountain Bell Microwave System

The telephone company has the most complete microwave system in the state of Montana. Their system generally does not now have the capability to carry a video signal but the equipment is available and can be installed. The phone company would like to distribute a PBS signal for Montana. Installation may take up to a year. The microwave system does not go to all towns in Montana. Mountain Bell Telephone would not plan to deliver the TV signal to communities that do not have microwave terminals. Montana sales poeple and engineers did not know how to indicate a price for TV signal delivery. Finally, American Telephone and Telegraph Long Lines out of New York City quoted prices which would be "very close".

The phone company would supply connections at sites for the TV signal. At a central studio connections might be available for the signal to go east and west. The state would pay a transmit or a receive loop charge each month if full time use were desired plus a station connection charge each month plus a mileage charge. The loop charge, which is the same for a transmitter or receiver, is $1051/mo./station and the station connection is $84.10/hour/location or $1577/month/location. The mileage charge between terminals is based on $0.79/airline mile/hour or $57.82/airline mile/month.

The phone company would also have a Maximum Termination Liability Charge (known as the MTL charge) which would be determined at the time of construction. The MTL is based on construction costs and is a charge a customer must pay only if he doesn't use the special facilities for a 10 year period. The MTL charge is reduced each month that the system is used by 1/120th. The MTL charge is of no consequence if the state uses the system for 10 years. If the state uses the system only 5 years, then half the MTL charge must be paid.

For comparitive purposes the approximate phone company charges for delivery of the TV signal to the locations shown on the map in Appendix A will be calculated. It is not known by the author whether the phone company has microwave facilities in each city or not.

The approximate total mileage involved in the communication system shown in Appendix A is approximately 1422 miles (assuming it is not necessary to tie the loop together). The mileage charge would then be $119,590.20 per month. The charges for 21 station loops would be $22,071/ month and the station connections would be $33,117/month. The total monthly bill then would be $174,778.20. The yearly charge, simply 12 times the monthly charge, would be $2,097,338.40. This amount certainly was not determined in an effort to find a minimum distance route. All distances were measured off a Montana map. The yearly charge calculated above is probably the best guess unless the phone company does some engineering work. With the system assumed above a broadcast quality TV signal would be delivered to each of the 20 sites (its already at the studio site) for approximately 2 million dollars per year. No provisions have been assumed to allow low-power transmitters to operate from repeater sites. The phone company probably would not allow this.

Other Licensed Communication Common Carriers

Two other licensed communications common carriers, Western Microwave and Intermountain Microwave, presently distribute TV signals throughout the state. Western Microwave brings national TV programs from Salt Lake City to Montana through Monida Pass via microwave. These signals are distributed to TV stations and cable TV systems along a route that extends from Kalispell, Missoula, Butte, Helena, Bozeman, Livingston, to all the cities on the Yellowstone River, plus

Great Falls and Lewistown. Intermountain Microwave serves the High-line area with TV signals from Spokane. Cities on their route include Kalispell, Polson, Missoula, Hamiliton, Cutbank, Shelby, Harve, Great Falls, and Glasgow. The rates that these companies charge their customers must be approved by the FCC. If the state of Montana had a TV signal carried by one or more of these companies, the state would have to pay enough to cover added incremental costs, a share of the total system costs, and a profit to the companies.

Mr. Don Herman, the Montana Manager of Intermountain Microwave was contacted relative to how his company would relate to a state PBS signal. Intermountain Microwave delivers TV signals to cable TV companies. Intermountain would like to have a PBS signal to deliver to the cable companies. A Spokane PBS signal would be delivered but an interfering signal is present at the Intermountain receiving site near Spokane. The Spokane signal, at the site, is not of usable quality. The microwave company will cooperate with the state as long as the plan is not detrimental to their microwave system operations or profits.

International Microwave would share sites and expenses if the state wants to install a parallel system for its own TV signal distribution. For a relatively nominal fee they will carry the signal on their equipment. The signal would then be available to the state for use at the terminal cities and the signal would most likely be carried by the cable systems. Arrangements could probably be made to have low-power transmitters operate off the mountain repeater sites of the system.

Notice that there are at least two ways to consider who pays the microwave system company that is delivering a state PBS signal to a community. The state would like to broadcast the signal so that the signal gets to non-cable TV households and the signal can be retransmitted to reach distant rural areas. The cable TV operator wants the signal for the cable. The cable operator also worries about losing customers once the state has the PBS signal available to an antenna at a residence. The state could pay the microwave company for delivery of the signal to the community; the state could transmit the signal; and the cable TV operator could get his signal free from an antenna. A second option is for the cable TV

operator to pay the delivery bill to the microwave company for delivery of the signal to the cable. Then the state would want to use the PBS signal from the cable to feed a low-power transmitter. Remember that most cable companies are willing to pay to have a PBS signal from outside Montana delivered. Both the state and the cable companies want the PBS signal. Cooperation should provide compromises that would make the signal delivery costs reasonable for both parties.

Mr. Dell Matthis, General Manager of Western Microwave, Inc., Bozeman, also would like to cooperate with the state in developing and distributing a PBS signal to the people of the state. Mr. Matthis has a plan for PBS which he believes would work well for the state. His plan is included at the end of this report under the "Matthis System".

Western Microwave will add the necessary electronics to carry a state PBS signal on their system. Mr. Matthis' "very rough, no commitment" estimate to carry the signal, with origination in Bozeman was for $500,000 initially and $30,000 to $40,000/month. This would produce a broadcast quality program in all the Western Microwave communities except Dillion. That is, these communities would have the program, Kalispell, Missoula, Deer Lodge, Helena, Great Falls, Anaconda, Butte, Whitehall, Bozeman, Livingston, Big Timber, Columbus, Lewistown, Billings, Red Lodge, Forsth, Hardin, Miles City, Glendive, Baker, and Sidney. The very rough costs can be extrapolated to a yearly basis. The first year would be $500,000 plus $360,000 to $480,000 producing totals of $860,000 to $980,000 for the first year. The second year, however, the relative costs would come down to $360,000 to $480,000. There are also 14 repeater sites on the Western Microwave system where the PBS signal could be made available for low-power transmitters. This would require some more equipment and costs but they would not be significant compared to the other equipment and costs.

The combination of the two television common carriers would cover the state well with PBS signal outlets. If national PBS and Montana programs were carried by the Montana PBS the cable systems would carry the signal. Low-power transmitters could carry the signal from the terminal towns and repeater sites to rural areas.

If the low-power transmitters are UHF the signal can be carried to most rural communities in the state. An isolated community (relative to a microwave feed system for cable TV) would welcome the PBS signal both for its cable system and for non-cable users. Note Figure 6.

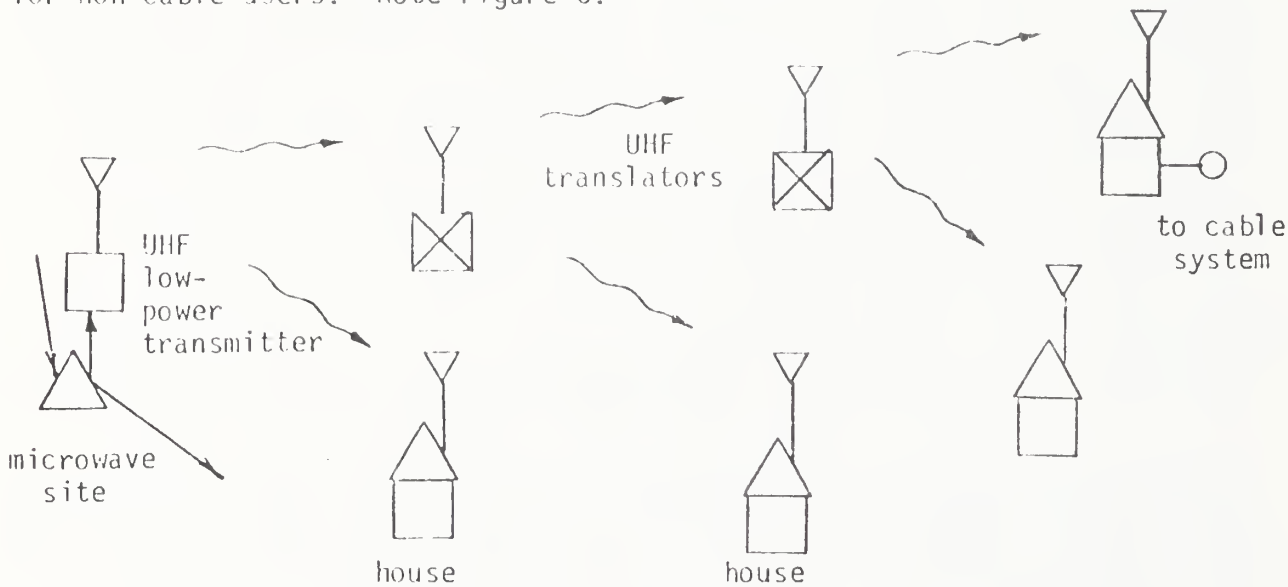


Figure 6. Microwave site feeding low-power UHF transmitter which feeds two UHF translators. Rural residences receive signal. A cable system is fed from one receiver.

SATELLITE SYSTEM Television signals of broadcast quality can be distrubuted to distant points via satellite repeaters. Home Box Office, many national PBS TV programs, several "superstations", and several religious stations are among the users of satellite systems. All of the national commercial TV networks use satellites for some of their program distribution. The demand, according to several people working with satellite video systems, is growing rapidly. Further, the costs are coming down quite like the cost of computers is coming down. There are more than 96 up-link (transmit) stations and at least 4000 earth stations (receiving sites) presently operating in the U.S.

The fundamental components of a satellite communications system to distribute a TV signal to several locations is shown in figure 7. The TV signal is the input to the system. At the up-link terminal the TV signal is used to FM modulate a 6 GHz microwave signal. This signal then passes to a high-power amplifier. The output of the high-power amplifier, usually in the range of

1-3 kilowatts, feeds a large parabolic dish antenna through a waveguide. The antenna usually recommended for up-link stations is a 10 or 11 meter diameter antenna. The large antenna is needed for two purposes; first it provides a beam of microwave radiation narrow enough to provide the satellite with an adequate signal level and secondly, the beam of radiation is narrow enough so that no significant portion of the radiation, in this case the microwave signal, hits the next satellite which is only three degrees of arc away. The FCC has strict limits on up-link antennas. A seven meter antenna meets their minimun requirements but the larger antennas are recommended, primarily because the satellites perform better with high levels of received signals.

The satellite appears as a microwave repeater site in the sky. The satellite recieves the modulated 6 GHz signal and translates the signal (with its modulation) to the 4 GHz range and then transmits the 4 GHz signal back to earth. The satellite, or "bird" as it is commonly called, is in a geo-synchronous orbit about the equator. Relative to a point on the earth's surface the satellite appears to be stationary. If an up-link uses only one satellite, its antenna could be permanently pointed at that satellite. Most up-link antennas are steerable, however, so that more than one bird can be used. Sometimes this is normal operation but occassionally there are equipment failures on satellites such that a

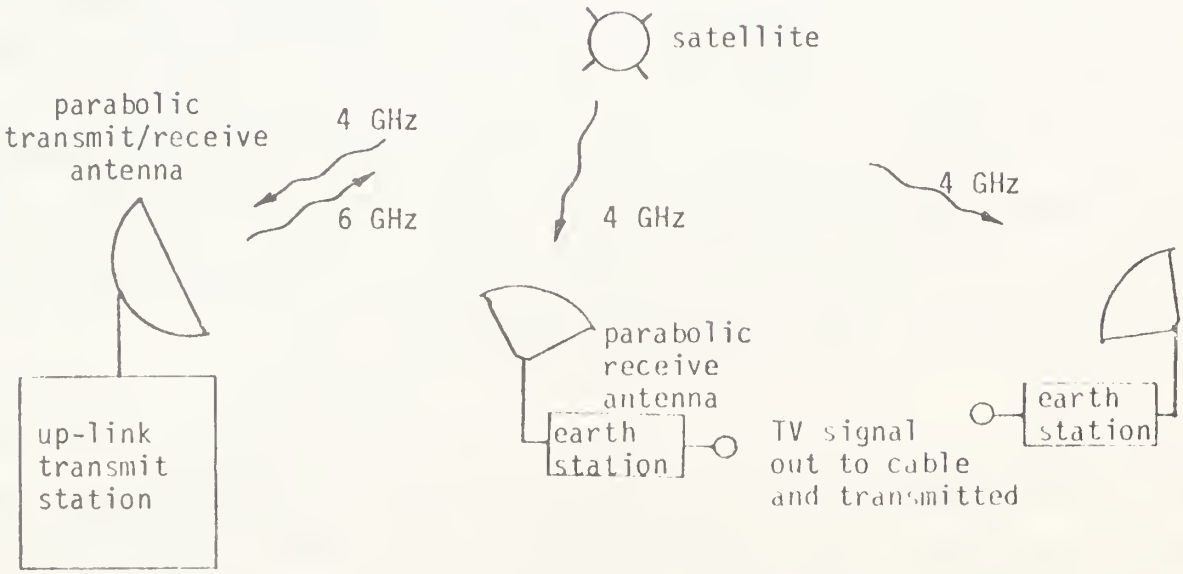


Figure 7. Block diagram of satellite communication system

particular communications system will have to use a different satellite. When this happens the system antennas have to be re-directed to a new satellite.

At the satellite the 4 GHz signal is transmitted back to earth. The transmit antenna at the satellite sends out a norrow beam of radiation such that only certain rather large areas of the earth are illuminated by the signal. Some satellite antennas illuminate an area on the earth to roughly match the contiguous 48 states while other antennas can illuminate smaller areas. A relatively strong microwave signal from the satellite will be received by a parabolic dish antenna pointed at the satellite if the antenna is in the illuminated area. If the receive antenna is not in the area illuminated by the satellite antenna it will receive no signal from the satellite.

The receiving antenna, electronics, and building for a satellite system are commonly called an earth station. An earth station receives the 4 GHz signal from the satellite, demodulates the signal, and has as an output the signal that was originally modulated onto the system at the up-link, in this case the TV signal. The quality of the TV signal out of the earth station is a function of the quality of the original TV signal into the up-link, the up-link power and antenna size, the satellite antennas and it's transmit power, and finally the size of the earth station antenna. The foregoing list ignored signal degradation caused by the various electronic signal processing in the system (such as modulation, transmitting, receiving, and demodulation). An earth station with a 3.6 meter diameter parabolic antenna will provide, at the earth station output, a signal with good quality for a home receiver. Often antennas with 3.6 to 4.6 meter diameters are used with earth stations providing signals to small cable TV systems. A 7 meter diameter antenna allows the output TV signal to have a quality that meets the standards set for major TV stations. That is, major TV stations require high quality signal. Sometimes it is more feasible to use a 10 meter diameter antenna for an earth station because less critical electronics is needed than when a 7 meter antenna is used to produce the same "excellent quality TV signal.

The up-link in a satellite communication system may or may not be in the area

on the earth illuminated by the satellite. For example, when a satellite is used to relay a signal from London to New York, the London antenna is not in the area illuminated by the satellite, which includes New York. If a satellite up-link was in Montana and if the satellite's illuminated area covered all of Montana, then the up-link antenna would be in the illuminated area. A parabolic dish antenna can transmit at one frequency and receive on another. In many instances the up-link station also receives the satellites's transmitted signal to monitor quality of the signal being received on the ground.

Most up-link and most significant earth stations have redundant electronic circuits. These reduncant circuits are switched into operation if the primary circuits malfunction. The monitoring of the primary circuits and the switching are done automatically. In the up-link there are two sets of modulators and high power amplifiers and in the earth stations there are two receivers and two demodulators. Reliability of these redundant systems far exceed that of the single systems. The cost, of course, increases.

An up-link terminal with a steerable 10 meter diameter antenna, commonly called a 10 meter dish, without a redundant transmitter, will cost approximately $250,000. This system is very complete and adequate except in case of transmitter failure. A transmitter failure may put the up-link out of operation for several hours to a day or two. An up-link with automatic monitoring and automatic protection (switching in the redundant transmitter) presently sells for $325,000 to $350,000 from one company and $450,000 to $500,000 from another.

Earth stations are much more varied than the up-links. A 3 meter parabolic dish and the necessary electronics to produce a good quality TV signal for a home or small cable system can be purchased for $10,000. The antenna is not easily movable and the electronics does not have redundancy. Another manufacturer sells a 20 foot dish which is not movable and the electronics has no redundancy for $25,000. The manufacturer says the 20 foot antenna is well made using steel and aluminum. Both earth station manufacturers do not include foundations, building, nor electrical power to the site, in their prices. A 7 meter dish, capable of producing a network quality video signal (excellent quality) that is not steerable

used with non-redundant electronics, will cost $30,000 to $35,000, again with the manufacturer doing no local ground work. A full broadcaster's earth system (one capable of providing a broadcast quality TV signal) with a 7 meter steerable antenna, total automatic redundancy in the electronics will cost $79,000 installed and tested by one manufacturer. Incidently, a few years ago the cost of a full broadcaster's earth station was ten times that cost. The prices of up-links and earth stations are still coming down.

One manufacturer suggested that at some earth stations, where the possibility exists that an up-link may be desired in the future, a 10 meter steerable dish be installed for the initial station. Then if automatic redundant electronics were used, the earth station cost would be $125,000. A different antenna would not be needed to convert the station to an up-link in the future.

In Montana it is suggested that heaters be put on certain areas of the parabolic antennas. The cost of this is $3,000 to $4,000. If an antenna is put in a very severe ice environment, it is recommended that the whole antenna be heated. This may cost $10,000 to $15,000.

A steerable antenna can be pointed at a different satellite through a motorized control system. A non-movable antenna cannot be redirected in a matter of minutes but it can be redirected in several hours. A steerable antenna can be pointed at one satellite for a particular program and can be redirected to a different satellite to receive a second program in several minutes (one company claims to do it in a minute). The non-movable antenna is redirected only if a major event occurs.

Finally the cost of the satellite repeater must be considered. Even though there are many repeaters (transponders) on a satellite, their cost, or more appropriately, their rent, is not cheap. A video transponder on a Western Union bird costs $300 per hour. A full time transponder with Western Union costs 1.8 million dollars per year, commercial rate. If the TV signal has some educational programs, an educational tariff may apply and the yearly rate is less. Radio Corporation of America, RCA, owns Comsat Satellites. RCA recently

sent new rates to the FCC for approval. They hope to lease a video satellite transponder for 1.5 million dollars per year but it is unprotected. That is, if the transponder fails, the leasee has no communications channel. A protected channel rents for 1.8 million dollars per year. If that transponder goes bad, it will be replaced. The cost of transponder rent has also come down. People in the industry believe they will become more plentiful and less expensive. RCA suggested that if the state of Montana wanted to rent a transponder in 2 or 3 years, RCA should be notified. Western Union, on the other hand, plans to launch two satellites in 1982 with 24 video transponders on each. All of the transponders have been requested already.

STATE SATELLITE SYSTEM CONSIDERATIONS A state satellite system to distribute the PBS TV signal throughout the state is not difficult to conceptualize. A single up-link could be used to deliver the signal to a satellite which in turn illuminates at least the state of Montana with a 4 GHz modulated signal that can be received at as many earth stations as desired. The up-link terminal costs will be assigned a value of $400,000. The up-link terminal will probably be at the PBS studio; hence site and building costs are considered to be trivial compared to the other up-link costs. The signal can be delivered to Billings via an earth station with an antenna and electronics so that the signal has adequate quality for retransmission over a high powered VHF TV station (if that were desired) and the signal can also be delivered to Ennis or Plentywood with quality needed for the local cable systems and a low powered transmitter. The cost of the Billings station might be $70,000 while the Ennis and Plentywood earth stations might cost $10,000 to $20,000 each. These costs are for the antennas and electronics. The site costs are not included but they should not be excessive because the earth stations can be located in friendly locations including in cities or towns or on the outskirts. Of course they can be located on mountain tops.

Different state designs using a satellite system to deliver a PBS signal to locations throughout the state are easy to consider. The state could deliver a broadcast quality signal to each city that presently has a TV transmitter (there are eight such cities) and a low power transmitter quality signal to each other county seat. If a $70,000 price is assigned the broadcast quality stations and $15,000 is assigned to the smaller stations, then the cost would be $1,280,000 for earth station electronics and antennas. The up-link and earth station costs would then be $1,680,000. To make the system work the first year would also require a transponder charge of 1.8 million dollars. The second year's operation would require a transponder charge and maintenance of the up-link and earth stations. This maintenance charge should not be excessive. Some of the county seat communities already have earth stations feeding cable TV home delivery systems. Chances are that a PBS transponder would not be on the same satellite that the existing antennas would be looking at, and hence, a seperate antenna and electronics would be needed (which is the earth station).

Another state design comparison could involve satellite earth stations to each of the 21 cities served by the state-wide microwave system laid out by McLeod and March[1]. The eight cities which had broadcast quality signals from their earth stations in the previous example are assumed to have that in this example. Each of the other thirteen cities are assumed to have $15,000 earth stations. The earth station antenna and electronics costs would be $755,000. Again the up-link charge of $400,000 would bring the total to $1,155,000 for equipment plus, again, the $1.8 million per year for transponder usage. Such a system would be poor usage of the satellite system capabilities. The important advantage of the satellite system is that the TV signal can be delivered anywhere in Montana with very good quality for $15,000. Thus it can give a signal to Broadus, Gardiner, Thompson Falls, or West Yellowstone.

A proper state-wide system design using a satellite system would require population studies as well as distribution system capabilities from the receive earth stations (that is, how far can the TV signal propagate from the receive station?). A significant number of states have up-links for PBS signals but most of these are not used continuously. Generally signals are fed to PBS/ETV studios in major cities of the state. These major cities often have populations exceeding that of Montana. Then, too, national PBS signals that can be received on earth stations are not in a format that allows direct use of the continuous signal for cable or transmitter use. That is, PBS does not allow use of their TV signal that is available via satellite unless it is passed through a PBS station with identifying capabilities.

Alaska is in the process of establishing a state-wide PBS/ETV system that uses a satellite transponder. The University of Alaska Instructional Telecommunications Consortium is the operating agency for the state-wide system. The system came into being as a result of a legislatively mandated study of instructional television. Isolated Alaskan communities, where instructional TV was probably most needed, were left out of any terrestrial microwave system. A state system using satellites overcomes this problem. An up-link will be used in Anchorage with 240 earth stations scattered throughout Alaska. A transponder leased from RCA Satcom will be used, with an annual rent. With the 240 earth

stations, every community with 25 people or more will have the PBS/ETV signal available. The system will provide "not only direct instruction, K-12, Post Secondary, and Higher Education, but also cultural, educational, and public affairs programming".(2) Most of the earth stations will have a low-power TV transmitter associated with it so that the signals can be sent throughout the communities. Local communities will also be able to disconnect the earth station feed to the low powered TV transmitters so that local programs can be transmitted.

The first several paragraphs of the FCC's discussion relative to Alaska's request for the authorization to have a "direct satellite feed to low-power TV transmitters" is of interest. These paragraphs are reproduced in Appendix B. In the writing, a PTV station is a public television station and a mini-TV is a low-power TV transmitter.

TELEVISION SIGNAL DISTRIBUTION TO RESIDENCES

VHF Transmission

TV channels 2 through 6 occupy the electromagnetic frequency range from 54 MHz to 88 MHz and channels 7 through 13 are in the frequency range from 174 MHz to 216 MHz. These frequencies are in the frequency range designated Very High Frequency, VHF. Channels 14 through 69 are in the frequency range 470 MHz to 806 MHz, a frequency range called the Ultra High Frequency, UHF, range. The VHF channels generally are developed first in an area because of better propagation characteristics and lower transmitter costs. All of the TV stations in Montana are VHF. More large VHF stations could be added in the state without serious degradation to the existing high powered signals. The FCC, at some time years ago, reviewed the population and land topology to determine a channel assignment arrangement for U.S. cities that would work with minimun interference. Some of these channel assignments were for commercial stations and some were for PBS/ETV stations. Such channel assignments were made for the larger cities in Montana. Generally there is a VHF channel for PBS/ETV available in most of the larger communities of Montana. Thus it is probably possible to get an FCC license to establish a high powered (10 kw to 300 kw) VHF station in these communities.

The FCC has said in the past that if a TV station was established to serve a community, the signal from the station had to be very high in amplitude within the city served. The residents of the city should not need an antenna outside the residence to receive an excellent quality TV signal. Then, too, commercial stations wanted to serve the rural areas around the cities. There are some very high powered TV stations in Montana. These stations were expensive. Not only was there a studio but generally the main transmitter was on a nearby hill or mountain. A microwave system was needed to get the signal from the studio to the transmitter and then the signal had to be modulated onto the proper channel, passed through the transmitter, and then to the antenna. This is shown in block diagram form in figure 8. Occassionally the studio and the transmit antenna are located at the same site.

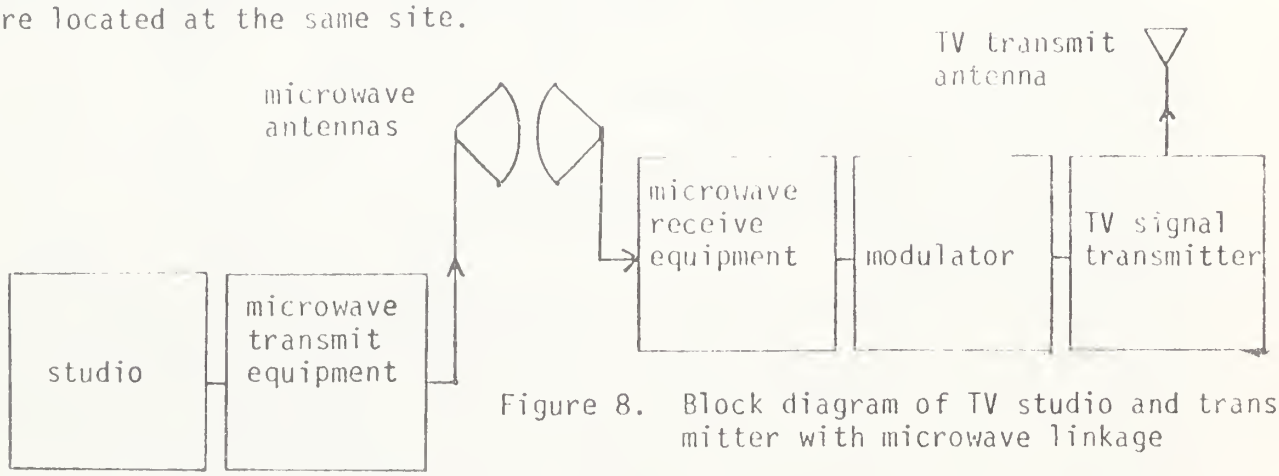


Figure 8. Block diagram of TV studio and transmitter with microwave linkage

The coverage from a high powered VHF TV station is a function of the power transmitted, the height of the antenna above the average terraine, the height of the antenna above ground, and the gain of the transmit antenna. A typical station will cover a 15 to 30 mile radius with a strong signal (grade A) and from there to 50 to 80 miles away with a signal that can be received with good quality on a gain antenna. There are wide variations in these distances depending on the station and the nature of the terraine around the station. A receiver with a good antenna on a mountain top 100 miles away may receive a good picture while a residence in a valley 40 miles from the transmitter may receive a very poor quality signal.

FCC TV applications for TV stations must list expected construction costs. The costs include all communication electronics, the studio, studio equipment, and other allied parts and services. Typical values listed by applicants are in the range of 1.7 million dollars (a recent channel 13 request from Salt Lake City with a 60 kw effective radiated power for the visual portion of the signal) to 2.1 million dollars (for example, a request from Central Wyoming College in Lander, Wyoming to use 100 kw effective radiated power on Channel 4 has an estimated construction cost of 2.12 million dollars). If Montana were to install a collection of high-powered transmitters in the state (probably 5 to 7 would give good coverage of the state) it would probably be decided that each transmitter should have at least a modest studio associated with it. This would allow local programs, political debates, county agent reports, emergency considerations, and the like to be transmitted for a region of the state. Thus the costs for the high-powered stations are probably going to be similar to the costs observed elsewhere. If an attempt were made to cover the state with 5 transmitters, the cost of the stations might be 2 million dollars each. Then, with these assumed prices, the 5 stations would cost 10 million dollars. If instead 7 transmitters were used each could be less powerful resulting in less cost. Let's assume the cost at 1.7 million dollars per station; the 7 stations would then cost 11.9 million dollars.

The performance of these stations would be similar to the performance of the Butte station or the Helena station or the Billings stations. Many rural areas would need to use translators to get a usable signal as they do now with the commercial station signals. A signal would be available for most cable systems in the state. In some cases a translator would be needed to get a usable signal to some of the smaller community cable systems, as is the case now with the commercial signals. The performance of the system is not difficult to visualize and was considered in detail in the PBS/ETV considerations in the state of Montana several years ago.

There are some factors that need to be pointed out relative to high-powered VHF stations and their impact on Montana. If a high-powered VHF station is located near a community with a cable TV system, then the radiation from the station

will probably interfere with the cable signal at the same channel frequency. Usually the cable system can not use that channel for a signal. This may mean the deletion of one of the signals the cable TV viewers have been watching. Also, the new TV signal will have to be carried by the cable system (the FCC requires the cable to carry all local TV signals). If the cable system had all channels used, another station originally on the cable would have to be dropped. Allied with these considerations is the fact that several cable systems are expanding the number of channels carried so that a new signal can be added without dropping any currently carried stations. A trivial rearrangement of channels on the cable may be needed in this latter case.

The high powered VHF stations may also cause some problem to the network of VHF translators present in the state. The FCC will require all nearby translators operating on the same channel as the new station to cease operating. Some areas of the state have station signals or translator signals on each VHF channel. Again some viewers will lose signals they presently watch. Because of the crowded VHF channels, the new signal from the high powered transmitters may not be able to be translated to a VHF channel. A UHF translator may be required which is more expensive and the residents must purchase a new antenna which is small and relatively inexpensive ($20 to $30). The state of Montana would have to consider sharing UHF translator costs to help distribute its signal to all people.

High Powered UHF Stations

A collection of UHF high powered transmitters could be used to distribute the PBS TV signal. The UHF stations would not be less expensive than the VHF stations and their performance would not be better. Their performance, which is nearly limited to line-of-site, would not be appropriate for most of Montana where the land topology is not flat. UHF stations work well in areas of country which are flat. In such areas a UHF antenna is commonly mounted on a 1000 foot tower on the highest ground in the vicinity. Then, with a significant amount of power (30 to 55kw) and a gain antenna, good coverage can be given to those locations in line-of-sight. In Western Montana the locations that are line-of-sight from most mountain tops are generally limited to one or two valleys and

then other mountain ridges and peaks. The high-powered UHF stations are not appropriate for mountainous terraine. A UHF station in Central Montana probably does not produce a usable signal at most residences 20 to 30 miles away. Eastern Montana is the most appropriate location for a UHF station but even there most rural residences are in valleys. High-powered UHF stations are not an appropriate TV signal choice for good coverage of rural Montana.

UHF stations do have several characteristics that are advantageous. One of these advantages is that the signal does not interfere with a VHF cable system. The UHF signal can, however, be easily received, translated in frequency, and put onto a VHF cable system. Another advantage is that there is less electromagnetic noise in the UHF frequency range and hence if a signal can be received, it is generally excellent quality. Further, receive antennas are not expensive. These factors allow a UHF signal to be received at a distant point (a high gain receiving antenna may be needed), translated in frequency, and retransmitted probably using another UHF channel. This process can be repeated two and sometimes three times. The quality of the resulting video picture is degraded with each translation but it has beeen found to be of acceptable quality after three translations. The possibility of using UHF translators to feed signals into valleys has to be considered. However using high-powered UHF stations to get the signal to a ridge overlooking a valley is not the most practical way to do it. A small UHF transmitter should feed an antenna pointed at the ridge.

A NEW POSSIBILITY-LOW POWERED TRANSMITTERS The FCC has recently decided to allow a new class of TV transmitters located, output power-wise, between common translators and major stations. The new category is tentatively labeled "low-power transmitters". The rules and regulations, if they have been determined, have not yet been published. In mid June an FCC engineer said there were more than 4000 applications on file for low-power transmitters. The FCC engineer said that 1 kilowatt transmitters will be allowed at locations more than 250 miles south of the Canadian border. At locations north of 250 miles south of the border 100 watt units will be allowed. The low-power transmitters do not have to be manned whereas at higher power levels someone that can control the transmitter has to be able to monitor (observe on a TV set) the signal from the station.

Also, apparently the FCC will allow these low-power transmitters to serve cities. Many of the low-power transmitter applications are to operate the transmitter from an earth station. A new name is even being used for this latter arrangement, namely "satellator". A block diagram of a satellator is shown in figure 9.

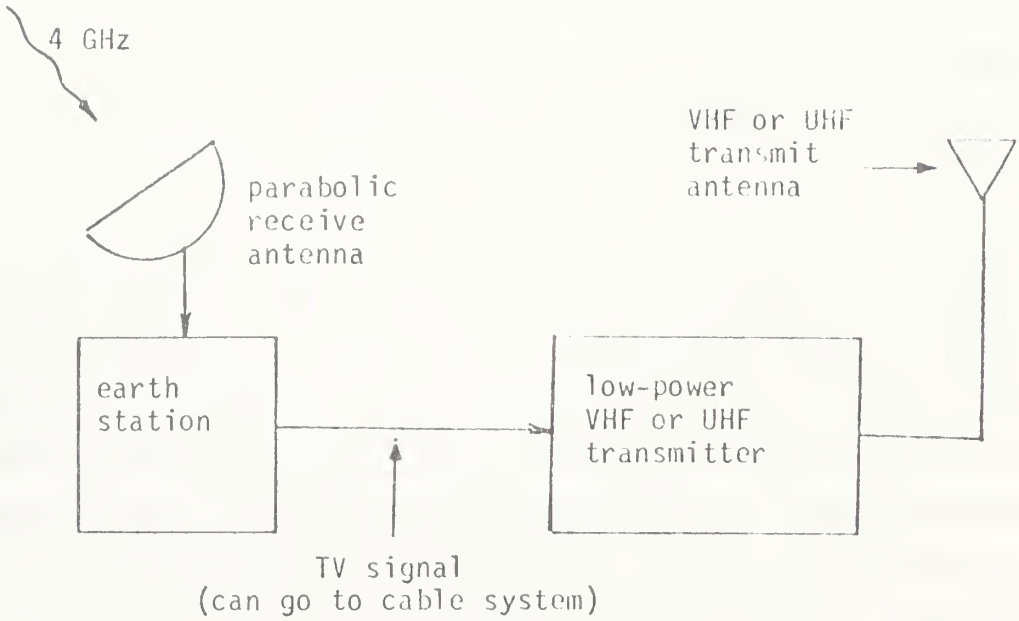


Figure 9. Block diagram of a satellator

The low-power transmitters will be allowed to receive their signals from other sources such as microwave systems, probably recorders, and maybe even other TV stations. The nature of the antennas allowed is not yet public information. Engineers working in the area of low-powered transmitters have said that the FCC will probably be very strict on the ruling about 1 kw VHF transmitters not being allowed within 250 miles of the border. However they expect the FCC to make exceptions for 1 kw UHF transmitters. That is, the engineers speculate that the FCC will allow them to be present nearer the border, but as exceptions. This possibility allows a new method of signal distribution to be considered, namely UHF low-powered transmitters.

In Montana very few of the UHF channels are used. Thus if a TV signal could be delivered to a significant number of locations, low-powered UHF transmitters,

if allowed, could distribute the siganl to the people of the state.

One hundred watt UHF translators have been allowed for several years by the FCC. This size transmitter is sometimes fed to an omni directional (in all directions) antenna that has gain in the horizontal plane (if you are located some distance horizontally from the antenna, the signal you receive will be greater than that which you would expect from a 100 watt transmitter feeding a simple dipole antenna). If the antenna is mounted on a high point, all residences within 20 miles, that are line-of-sight to the antenna, will receive the signal with excellent quality with a simple antenna. If a house is 30 miles away, but line-of-sight, the signal can be received with a more complex antenna. If a 1 kw transmitter were used with the same antenna, the distances for equal quality TV signals, each get multiplied by a factor of approximately three. Thus all residences within approximately 60 miles, that are line-of-sight to the transmitter, should receive strong signals and a site 90 miles away should be able to receive a good signal with a good antenna. From the site 90 miles away another UHF repeater can be installed to get the signal into another area. The process can be repeated again. The low-power transmitters would be more scattered than a few high-power UHF transmitters so that more rural residences would be line-of-sight to at least one transmitter. If a residence was line-of-sight to two such transmitters, either signal could be used for the local TV. The two signals would be on different channels and probably in different directions.

A grid of these UHF transmitters can be visualized providing an area with TV signals. Surprisingly few transmitters are needed to provide all of Montana with signals if the state is assumed to be almost flat; but it is not! In order to see how well the state can be provided with TV signals via this system would require an extensive engineering project. It is obvious that in many instances UHF transmitters with less than 1 kw of power would be adequate. Often times directional antennas which point the energy in one general direction would be more advantageous than omni directional antennas. These UHF transmitter systems have worked well in Colorado and Utah. Another tool which

can be considered in such a system is the 100 watt VHF translators. In areas where channel crowding has not occured these could be advantageous. For example, a 100 watt VHF translator with four directional antennas, each pointing a different direction, has been installed in Montana. According to the translator man that did the work a good signal was received up to distances of 50 miles in each direction. Other arrangements of VHF translators can also help. UHF translators are often used to supply the input signal to VHF translators. Then, too, some southern parts of Montana are more than 250 miles from Canada. Low-power VHF transmitters near Broadus, Red Lodge, or Dillon might serve the areas well.

The UHF translators have two negative aspects. One is the fact that the units with power greater than about 20 watts have tubes in their power amplifiers. These tubes tend to last only about 6 months to a year. The UHF translators with 20 watts or less use semi-conductors throughout and are more reliable. A second draw-back to the UHF translators is that they are expensive. The electronics for a 100 watt UHF translator will cost at least $18,000. This price includes antenna and coaxial cable. In the past there has been little demand for 1 kw UHF transmitters. No post-development competitive cost was found.

CABLE TV SYSTEMS The majority of residences in the larger Montana communities receive their TV signals from a cable TV system. In Montana the cable systems carry a selection of programs (actually signals from different stations) on the VHF channels. If there are no strong interfering signals from local TV stations, all the channels can be used (2 through 13). The signals used by cable TV operators come from at least three sources, local stations, station signals brought in by microwave systems, and signals from earth stations. Sometimes a local weather and time channel comes from a local camera associated with the cable company.

A decade ago only large cities could justify cable TV costs. Today, especially with the advent of earth stations, cable TV systems are practical in much smaller communities. Companies that install cable TV systems say that it is desirable to have at least 400 homes in a community for a cable TV system to be

practical. However, cable TV systems are being or have been installed in smaller communities such as at Colstrip and Ennis. Present costs for a cable system are approximately $8,000 per mile of cable if the cable can be carried on existing poles. This assumes 60 users per mile of cable. To run the cable where there are fewer users per mile does not appreciably reduce the cost. If a buried cable is desired, the costs are approximately $11,000 per mile.

Most of the smaller communities in Montana do have or soon will have cable TV systems. The smaller communities generally don't have a microwave terminal available to get the variety of stations carried by the common carriers. Hence they would welcome more signals. Most of the smaller communities do not have a PBS/ETV signal available to them. If the state provides a PBS/ETV signal to them, they would gladly carry it on the cable system. Cable system operators might even share in the cost of getting the signal.

The larger cities have different problems relative to cable TV system use. Some of the systems have all the VHF channels used and the operators are not looking for new stations. Some of the systems which are presently full are being expanded and the operators would welcome new signals. Other systems are not fully utilized now and a PBS/ETV signal would be very welcome. As mentioned earlier, a cable TV station must carry the signals that are available to the city residents via a simple antenna. If the city were to receive a PBS signal via a low-powered transmitter, it is not clear whether the signal would have to be carried on the cable; however, it is probably true that all the cable systems that have all VHF channels used have KUED, the PBS station from Salt Lake, carried on them. Most cable system operators would be pleased to convert that channel to a Montana station if the Montana station were of equal or more interest to Montanans. Note that presently the Montana cable TV systems that carry KUED out of Salt Lake pay the microwave common carrier for the signal. The microwave common carrier serving the high-line area has no PBS/ETV signal available for customers at this time.

COMBINATIONS OF LONG DISTANCE AND LOCAL SIGNAL DISTRIBUTION

Microwave Signal Transport-Transmitted Distribution

A small number of high power transmitter stations has been discussed prior in

this report. The resulting coverage from such a set of transmitters was marginal without a substantial number of translators to feed the rural areas. The cost of the high power transmitter stations was high but local programming was a desired feature. The stations were going to have manned (FCC regulations).

Such a collection of stations would be expected to receive much of it's programming from a central state studio. The reasonable way for the central studio to get the signal to the large transmitters is via microwave systems. The state is adequately covered by common carrier microwave systems so that the state could get it's signal delivered to any major city site. If the state were to have it's own microwave system for other communication systems, again most major cities would be on the system and the added equipment to carry a TV signal would not be expensive (relatively). A state-owned microwave system for TV signal distribution only does not appear to be economic.

Microwave Signal Transport-Cable and Transmitted Distribution

If the TV signal is delivered to the several cities with high power transmitters operating, the response of the cable TV system operators will be varied. In the major communities that have the transmitters (and in some nieghboring communities) the PBS signal will have to be carried on the cable (FCC rule). In communities where the signal is not received with good quality the local cable company does not have to carry the signal. If KUED is available with goood quality from a microwave common carrier, the cable operator may continue to use that signal. If the state were to bring in the PBS signal to the community via microwave or translators, the cable system would carry the signal. Obviously if the cable at a community does not have a PBS signal, they would like to carry a state PBS signal if it were available. Such a cable system is present in Ennis. Clearly there is room for negotiations to get the signal to such communities. The cable system operator is probably not too interested in providing over-the-air PBS signals to non-cable TV subscribers in the area, but the state should be. The problem at Ennis could be solved with a strategically located translator. The signal to the translator might come from a high-powered transmitter near Butte.

Another option available with microwave systems used for long distance distribution uses low-power transmitters and translators to get the signal to residences. The microwave system, be it state owned or leased, will have many repeater sites throughout the state as well as terminals in most major communities. If a low-power UHF or 100 watt VHF transmitter is used from each terminal site and from many of the repeater sites, the major communities will have the signal and an excellent quality signal from a high elevation will be available for certain rural areas. The signal coverage in the rural areas can be extended using translators, especially if UHF signals are used. The cable systems in the cities with microwave terminals in them would probably carry a Montana PBS signal if it had the national PBS programs of interest on it as well as Montana programs. The smaller communities without a microwave terminal, for example, Ennis, might be able to receive a signal from a microwave repeater site (where a low-power transmitter was located) or a translator might be needed. Again, the cable system in such communities would be pleased to carry the signal

A microwave distribution system, even with only low-power transmitters, does allow some flexibility relative to different programming for different parts of the state. The central state PBS signal, for example, would be delivered to Billings. At Billings a studio could change the format and insert programs of interest to Eastern Montana. From there, going east at least, the Billings signal could be carried. Exactly where the signal would go would be a function of the microwave system layout.

The microwave to low-power transmitter to translator possibility will be discussed in more detail later in this report.

Passive Earth Station-Cable Distribution

A Montana PBS station with an up-link to a satellite transponder allows a passive earth station to be able to receive the signal with broadcast quality. The signal can be fed to a cable system. In large cities the state would want a transmitter to provide a signal to non-cable users. The cable systems would probably carry the signal. In the smaller communities with KUED available via microwave, a cable TV operators decision to carry the Montana signal or not would depend on the cost of getting the signal and its popularity. A cable

system with no microwave KUHD available would carry the Montana signal if the signal acquisition costs were not too expensive. Again, an earth station in Ennis would probably feed a low-power transmitter also and the state would at least share expenses of the earth station.

Passive Earth Station-Transmitted Distribution

Using the satellite channel to get a TV signal to a few high-power transmitters does not use the satellite channel capabilities well. The satellite channel has advantage only when many earth station sites are to be served. With a grouping of high-power transmitters practically all communities in the state could be served either by the transmitters or translators (sometime several translators would have to be in series). The satellite channel is not appropriate and too expensive.

Passive Earth Station-Cable and Transmission Distribution

A satellite system can be used advantageously to serve a collection of low-power transmitters in many communities. At least one earth station and low-power transmitter can be considered for each county. Maybe for the major communities a moderate high-power transmitter is used (like the 10 kw commercial unit at Miles City). Billings would have an earth station with transmission capabilities. The cable TV system might be required by law to carry the signal (FCC rules not out yet if the transmitter were low-power). Again, if the national programs were available and the programs originating in Montana were good quality, the cable operators would gladly carry the Montana PBS signal. Those communities without a microwave feed system to the cable system would be pleased to have a Montana PBS signal to carry. Either via an earth station or a transmission most communities would have the signal available. For example, Ennis might have an earth station because it's a county seat while Ronan and St Ignatius might receive the signal via a low-power transmitter operating off an earth station at Polson. Isolated communities like West Yellowstone could receive the signal via an earth station or via one or two translators from Ennis.

Chances are very good a Montana PBS signal would not use the same satellite that most cable companies now look at with their antennas. Thus, the existing earth station antennas probably can't be used to receive the Montana PBS signal.

A satellite system also can be used advantageously as an educational tool. Special classes, for which a small community may not be able to hire an instructor, could be presented via the satellite system so that the small community school could have it available to the students. For example, students graduating from some of the larger high schools in Montana not only have had trigonometry but also the have had a quarter or two of calculus. Students graduating from some small high schools don't have this opportunity. The satellite system could provide a more nearly "equal educational opportunity" to all Montana students. Classes could be presented in the morning hours over the system or, as an alternative, the classes could go over the system at night, from recordings made earlier, and then recorded at appropriate sites for presentation the following day. The recordings at the remote locations could be automatically started by signals originating at the system up-link.

A satellite transponder can carry only one signal at a time. Thus only one up-link is essential and all the earth stations will receive the same program. However, more than one up-link may be desired; it is certainly possible and many of the existing satellite systems do have more than one up-link. Obviously only one up-link can work at a time. The second up-link will cost as much as the first up-link but the system reliability will be significantly improved. If a system has only one up-link and a catastrophy occurs, like an equipment fire or severe antenna damage, the whole system is idle until the up-link is repaired. With two up-links the system can survive one catastrophy. Then, too, more than one studio and up-link may be desired due to program origination points. Multiple studios can also be handled in another way. The studios not near the up-link can transmit signals to the up-link via microwave, either state owned or leased. Up-link reliability with this process is not helped but the costs would be. Local origination of programs can occur at any earth station relatively easily. This is discussed in the next section.

Local Origination-Cable Distribution

Some cable systems in the state of Montana have had capabilities for the local origination of programs. At least one cable system, with local program origination capabilities, had a channel left vacant to use for such programs. The system manager says that in 15 years he had only one or two non-university related requests to use the system. The local university did televise one set

of classes and televised the Bobcat-Grizzlie football game a time or two. Finally, with the purchase of an earth station, the cable TV company now uses all VHF channels.

The manager of the cable systems in Montana said that most cable systems do not have studio facilities such that local programming can occur. When asked "If the state of Montana installed a simple studio at or near your central terminal, would you carry locally originated programs?", he said "Oh, yes". He also said that cable TV systems would like to be involved in such activities. He also mentioned another possibility that the civil defense officials should consider. Equipment is made that will interrup the audio on all channels carried by a cable TV system and replace the audio with emergency messages. For example, this would alert cable TV watchers of danger from some disaster like the flood from a dam breaking or a fire.

There are no significant legal problems to putting locally produced programs on cable TV. If the cable has all channels used, usually at least two channels have the same program at the same time. One of these channels would be used for the local program. The small cable systems would welcome such programs but they probably can't afford a studio. Whoever supplies a studio needs to evaluate its need carefully.

Local Origination-Transmitted Distribution

The signal distribution option using high-powered transmitters had studios associated with each station. These studios were for locally developed programs. The local program would go out over that high-powered station and any translators using that station's signal. The program would also go out over all cable systems that were using that station's signal. County agent reports, emergency messages, adult classes, and maybe some sports events seem like appropriate programs. No longer is the signal confined to one community as it is with a cable system. Note that with the local programming done on the high-powered station, the local program propagates further and gets into the nearby cable systems. The local program is a part of the PBS station program.

If a satellite system is used with a family of earth stations, locally generated

programs can originate at each earth station. The earth station program will probably be used to feed a cable system and a transmitter. If a simple studio were nearby also, then the cable system and transmitter feed could be disconnected from the earth station and the feed replaced with the signal from the studio. Then the local signal would go to the cable system and to the transmitter and antenna. The propagated signal would probably be picked up by translators which would feed the signal to other areas. Other cable systems might also be receiving the transmitted signal which in turn would be put on the cable. Coverage from an earth station might be about the size of a county. The local programs could include high school events, county agent reports, emergency messages, political debates, and maybe sports events.

If the PBS signal were carried throughout the state via a microwave system with low-power transmitters broadcasting from city terminals and repeater sites, a locally generated program can reasonably be used only at the city terminals. The local high school debate team is not going to go to the top of a local mountain to conduct a debate at a low-power transmitter site. To relay the debate from a community studio to the mountain top transmitter is costly (but easily done).

Local Origination-Cable and Transmitted Distribution

Almost all options using cable systems and transmitted signals have been considered in the two previous sections. If a state PBS system were in operation with local programming it seems reasonable that the local programs should go over both the local transmitter and the local cable. This generally would occur under the conditions set forth above. The local programming option seems to favor a signal distribution system that does not cover too broad an area. The several large transmitter system of signal distribution practically makes county or city locally originated programs unsuitable as most of the viewers are not interested. For example, consider a debate about something of interest in Powder River County (Broadus) being transmitted via a big station in Billings. The debaters would also have to travel to Billings. With a microwave system feeding many sites, and maybe 20 cities, the local programs can be more "local". Finally, with a satellite system the location served can become that area served by an earth station.

THE "TERM" PROJECT AND ALLIED CONSIDERATIONS Montana State University has received grants to develope a system to develope and distribute TV programs to various Montana cities via the Western Microwave Company system during times when at least one channel is unused on the microwave system. For many years a TV signal link has existed between the MSU campus in Bozeman and the Western Microwave Company's feed point at Whitehall. Most of the signals carried by Western come from Salt Lake, over Monida Pass, and to the Whitehall repeater (via microwave).

Generally the color video programs will be on tape at the MSU TV studio. Late at night the tape will be played into the microwave system. The program will actually be carried throughout the microwave system and all cable systems attached to the microwave system. At certain terminals in towns served by the microwave system video recorders will be present. Prior to the start of a program on the pre-assigned channel, signals will be sent to start the recorders. The recorder records the program while it is present. At the end of the program the recorder stops, probably due to another signal sent from the studio. Thus the unattended tape recorder in Miles City or some other community will have a recording of the program for use the next day. The next day the program can be presented to groups on a monitor system or replayed on the local cable system or the program can be played on a local station. At least sometimes when the tapes are replayed to groups, an interactive audio system, the Educational Telecommunications System available through Eastern Montnan College in Billings, will be employed to let the audience talk with the people who made the program. A more complete description of the project is included in Appendix C. The Appendix C document is from the MSU Office of the Vice President for Research and contains general information about the project.

The costs of using the microwave system to do the TERM project as shown on the proposal are not too meaningful. The microwave company actually helped the project by supplying matching funds, in the form of reduced prices, for carrying the signals.

The TERM project has both some clever aspects and its results could have significant implications. Fortunately the only aspects of the project that are

of concern in this report are the long distance signal delivery system and the final delivery of the programs to the people. The late night use of the microwave system is good use of an asset. The unattended recording at the distant terminals is good use of modern technology. The programs could have been recorded at the Bozeman studio and delivered to the communities some other way, like via mail.

The TV programs are going to get to the people in several forms. It is hoped some of the programs will be carried on local commercial stations, all will apparently be on local cable systems, and some will be used for group presentations. The state can distribute programs to the people via recordings. The programs done this way are not going to replace KUED on the cable systems. It is not what is commonly called a Public Broadcasting System, PBS. It is more correctly a limited video educational system. Several of the signal delivery systems discussed in this report would fit well into this type of program delivery. For example, the high school calculus class could be sent over a satellite system and recorded automatically at the earth stations in the smaller communities. Actually, night use of any of the systems will provide access to program recording at most communities.

THE NEVADA PROPOSED SYSTEM Presently the only PBS station in Nevada is at Las Vegas, population 400,000 to 500,000 people. Reno, with a population of about 120,000, and the other Northern Nevada communities have no PBS. The University of Nevada is planning to build a PBS staion for Reno. An earth station will be built, and the programs will be transmitted using a 1300 watt transmitter on channel 5. Three fourths of the project funding will be supplied by the National Telecommunications Information Administration. The expected station costs are approximately one million dollars.

The Reno PBS staion is not going to be used, at least directly, to supply PBS to the other Northern Nevada communities. Mr. Dan Tone, Director, Office of Communications & Broadcasting, University of Nevada, Reno, has a plan to provide these communities with PBS. The group has even considered using their technique in two Montana communities. The PBS stations for these remote, smaller, communities involve a remotely controlled earth station feeding a

low-power transmitter. Presently national PBS has four transponders leased on a satellite. These transponders are used primarily to distribute programs from Washington to the PBS stations across the nation. However, the satellite channels are also used to distribute PBS programs from other areas, generally where PBS stations have up-links, to either state or regional earth stations. When this is done national PBS makes the transponders available at a reduced hourly rate ($150/hour instead of $300/hour that Western Union would charge). An earth station in Nevada or Montana can receive these programs. National PBS does not allow continuous direct rebroadcast of its transponder channels. Between each program the channel is used for transmitting information to the PBS stations that is of concern only to the stations and should not be broadcast. However, if a PBS station transmits some other signal during these several minutes each hour, the main PBS programs may be transmitted. PBS stations often give their station identification, acknowledgements, and announcements during these intervals.

Dan Tone's group wants the remote earth station to receive a particular PBS transponder signal while a desired program is being presented. When the program is over the station will show a station identification picture until another appropriate program becomes available from the satellite. Then the earth station will tune to that transponder frequency and the new program will be received and transmitted. The control of the earth station will be via computer and leased telephone lines. The computer will be in Reno.

The mini-PBS stations, as they are called, will each have a low-power transmitter operating and if there is a cable system in the community, the signal will be put on the cable. It will be possible to enter recorded or live programs at the station. The recorded programs will simply be played-back, replacing the earth station signal. Hence the recording will go out through the transmitter and the cable system. Then, too, adequate camera facilities will be provided so that some live events can be transmitted. It is hoped that the mini-PBS station can be located near some existing studio so that it can be used as the studio.

In each community a Community Programming Board will determine which PBS pro-

grams should be received and will evaluate and schedule local programs. The Board will then communicate their wishes to the people programming the controlling computer in Reno. The controlling computer will then be programmed to have the earth station receive the proper programs, with station identification between programs, or the station can be put into local control for either playing-back recordings or live programs. Refinements include music from the satellite to be put on the TV audio during station breaks and they hope to be able to have printed message capabilities for the video. The printed messages would be put on locally and might be programming notes or local brief news items.

The cost of one of these mini-PBS stations is estimated to be $80,000 to $85,000. This assumes a nearby studio is used. No operator is needed at the station unless local programming is occurring. The local community is expected to provide $25,000 as match money for federal grants. Most communities, including Roundup and Circle in Montana, that have considered the mini stations have considered the cost to not be a major problem. Note that special programs can be sent to these communities via an up-link using one of the PBS transponders for an hour or more. The mini-PBS stations would tune-in the proper transponder to receive the program. An up-link in Reno would be convenient but not essential.

The "Matthis System" Mr. Dell Matthis, General Manager of Western Microwave has a plan to develop PBS for Montana at reasonable cost. Initially the PBS system starts slowly and grows as funds become available. New technology, new FCC rulings, and existing facilities are all used to advantage.

The process used by the commercial TV stations in Montana to receive their programs is essential to this discussion. The Montana TV stations generally receive their national programs from Salt Lake via Western Microwave. The signals brought from Salt Lake to Montana stations still have Salt Lake commercials and Salt Lake TV station identification. The Montana stations "strip" the Salt Lake commercials and Salt Lake TV station identification. The Montana stations insert their own commercials and identification. This signal is then transmitted as the local Montana station's signal. Mr. Matthis

believes that a Montana PBS station can use the Salt Lake KUED signal in the same manner. That is, the PBS signal from KUED in Salt Lake would be delivered by Western Microwave to a Montana studio where the signal would be "stripped" of its KUED identity and a Montana identity put on the signal. Then, too, like the commercial Montana stations, the Montana PBS station would have the ability to delete certain KUED programs and insert programs of more interest to Montanans. The programs inserted could come from recorded programs or from live programs in the studio.

The signal from the Montana PBS station would then be put on the Western Microwave system (and surely Intermountain Microwave would cooperate) replacing the KUED program on Western's system and providing the first PBS signal on Intermountain. Presently the cable TV companies pay Western to carry the KUED program. Mr. Matthis believes they will pay all or much of the tariff for the cable companies to carry the Montana PBS signal. This then puts the Montana PBS signal into 21 of the larger communities (those with cable systems fed by microwave systems). Mr. Matthis believes that the cable system operators will allow the state to broadcast the signal from either the microwave terminal in each of these communities or from some point on the cable system. The broadcast will be via an unattended low-power transmitter. The cable system operator will cooperate (it is hoped) for public relations and perhaps for cost sharing. The low-power transmitters will provide the non-cable TV users in the community with the PBS signal. The transmitted signal, especially if it is UHF, will allow neighboring rural areas and communities to receive the PBS signal by using translators.

Both microwave companies have various repeaters, not in communities, in order to propagate the microwave signal across the state. Mr. Matthis would allow low-power transmitters to be installed at these sites on the Western system to send the PBS signal to the surrounding area. If the low-power transmitter for each repeater site is engineered well using directional antennas, good coverage should result. This signal can also be repeated, by translators, a time or two. The Western Microwave system has 15 repeater sites while Intermountain has 8. A charge would be made by the microwave companies to provide the appropriate signals at the repeater sites.

There are several areas of the state where special consideration has to be given in order for the PBS signal to get to the area. One of these areas is in and around Dillion. The Western Microwave signal that goes to Dillon comes from Salt Lake, not Montana. Dillon would have to receive a signal via low-power transmitter and maybe a translator or Western Microwave could put in the equipment to carry the signal from Whitehall to Dillon on the microwave system. This would be costly. The Libby area also is not served by a microwave system. Special engineering would be required there, too. Some areas in Eastern Montnan, like Broadus, Jordan, and other communities, would require special attention. This special attention might include a remotely controlled earth station (as being developed by Dan Tone at the University of Nevada) with some Montana programs available via the satellite. This would require an up-link; an out-of-state up-link could be used. The charges for the satellite transponder would be on an hourly basis. If a PBS transponder were used, the cost would be, at least in the second half of 1981, $150/hour. If the earth stations had been designed to also use a standard transponder on the same satellite, its cost would be $300/hour.

Mr. Matthis also points out that the microwave system, as it now stands, has the ability to deliver the KUED signal to Bozeman and then to carry a Montana PBS signal from Bozeman to all other microwave sites in Montana except Dillon. Within the Western Microwave system the equipment for doing this is all in place and operational (except proper signals at repeater sites for low-power transmitters). The nature of an agreement with KUED has not been investigated but no serious problems are foreseen. A Montana PBS studio in Bozeman could thus serve the state. If an earth station were constructed at the studio, PBS signals from satellites could be used for the station giving a larger selection of programs than is available from KUED.

<u>HOW TO SERVE A TYPICAL CITY OF 5000 PEOPLE</u> All cities of 5000 people in Montana have a cable TV system in operation. The cable system operator would carry a Montana PBS signal if it were available via the microwave system or if it came to him via transmissions or earth station. The cable system operators want to provide their audience with the signals they, the audience, want. One problem

that might arise would be where the PBS signal was transmitted on a VHF channel such that the cable's corresponding channel could not be used. In this case the cable TV operator with a full VHF signal selection, would have to have one less station available for customers.

All non-cable users in the community could be supplied a UHF signal so that with a moderate UHF antenna ($20 to $30) they too could receive the signal. The UHF signal could come from a 100 watt or 1000 watt unmanned transmitter that would also provide a signal to the nearby rural area. The Montana PBS signal that is transmitted on the UHF could come from a microwave terminal, a cable connection, or an earth station. The signal to smaller communities might come via a UHF low-power transmitter and UHF repeaters.

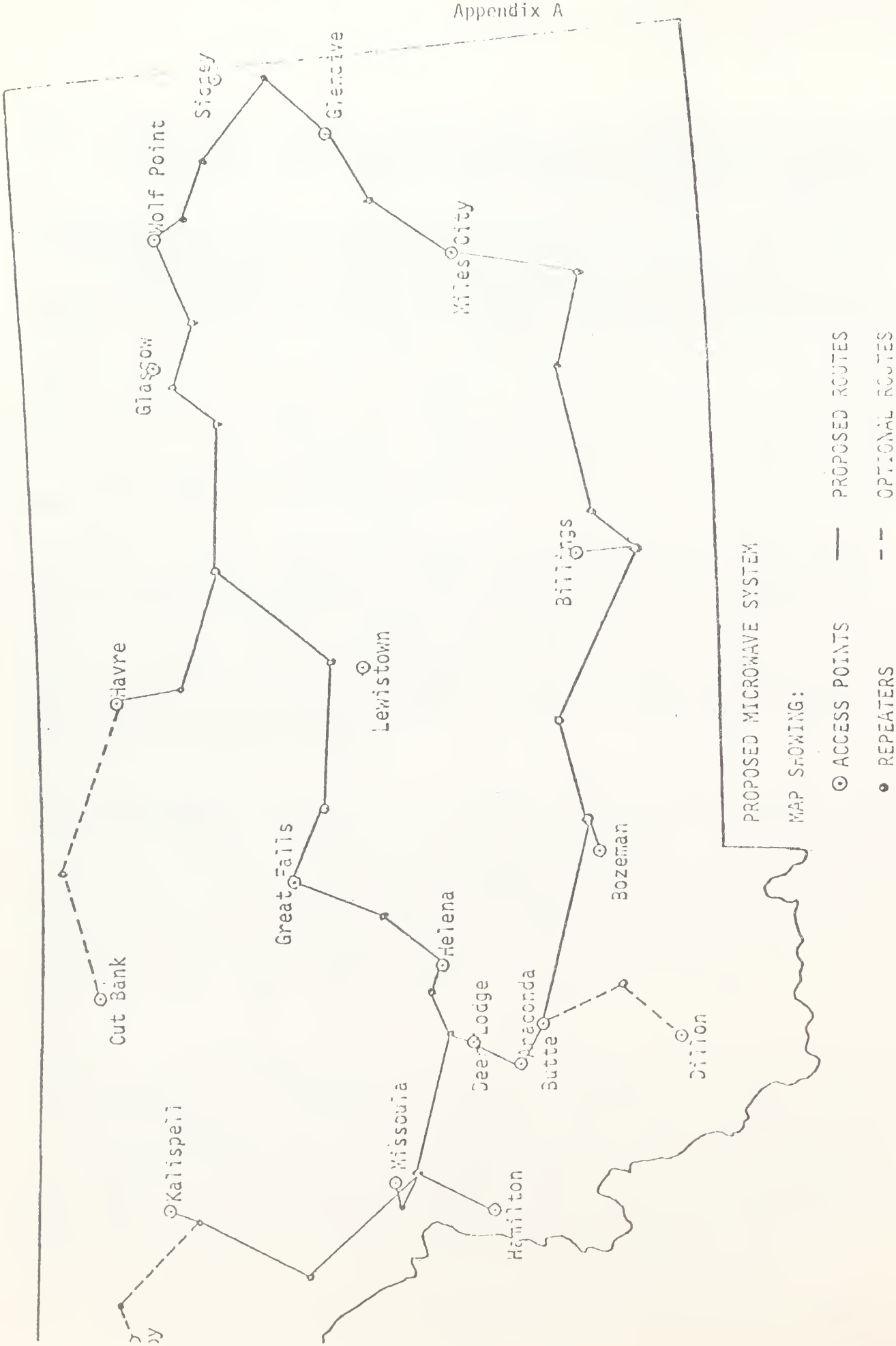
If a VHF low-power transmitter would not interfere with the cable system nor any nearby translators, it could be used to serve the community and the nearby rural areas. However, the VHF transmitter location may be important. It should be located such that the same VHF antenna that is presently used at the residences will be able to see the PBS transmitter. Antenna rotators or VHF antennas are more costly than UHF antennas.

CONCLUDING REMARKS Several systems to deliver a Montana PBS signal to communities and then to households have been considered in this report. Some of the systems provide good coverage to cities but some work has to be done to get the signals to the rural areas. Other systems cover the whole state with equal ease. Some of the systems can be built a part at a time while others are almost a "do it all at once" project. Some of the systems can be used advantageously by local groups while with other systems this is not too easily done.

The state decision relative to PBS delivery systems should be based on the nature of the coverage of the state that is needed, a knowledge of what the people want the system to be able to do, and the money available. When these have been at least roughly determined, the two or three feasible methods of providing the service should be investigated in detail. This investigation should include a state design, a performance estimate, and a cost estimate for each system.

(1) McLeod, B.R. and March, D.N. , "Final Report, Montana State Communications System", Electronics Reasearch Laboratory Report #3373, Montana State University, December 31, 1973

(2) Formal request from the Universigy of Alaska Instructional Telecommunications Consortium to be granted membership affiliation and station status with the Public Broadcasting Service by William T. (Bill) McCaughan, Director, Media Services, University of Alaska Instructional Telecommunications Consortium, January 19, 1981


Sidney
Glendive
Wolf Point
Miles City
Glasgow
Billings
Havre
Lewistown
Bozeman
Great Falls
Helena
Cut Bank
Lodge
Anaconda
Butte
Dillon
Missoula
Kalispell
Hamilton
PROPOSED MICROWAVE SYSTEM
MAP SHOWING:
ACCESS POINTS
REPEATERS
PROPOSED ROUTES
OPTIONAL ROUTES

Appendix B

The State of Alaska has established a system of "mini-TV" stations to serve small villages. Each mini-TV is equipped with a satellite earth terminal and a low-power transmitter. There are presently about 80 mini-TVs which carry a combination of commercial and public television programs which are received off-air in the Los Angeles area and retransmitted via satellite to Alaska.

The State of Alaska has committed funds to increase the number of mini-TV transmitters to 250, enough to provide service to every community of 25 people or more. The funding also includes establishment of an instructional service over a separate transponder to be picked up by the mini-TVs. It is this new instructional service for which the University of Alaska has requested permission to use PBS programs.

The new service is scheduled to begin in September 1981 by which time 120 of the mini-TV transmitters will be in place with the number increasing to 240 by the following year.

A consortium has been formed to operate the instructional service headed by the University of Alaska. The consortium consists of the Alaska State Department of Education, the Alaska Division of Telecommunications, and the University of Alaska Statewide System of Higher Education.

Sources of programs would be (1) instructional programs produced by the University of Alaska (which would also be made available to the PTV stations), (2) programs taken off-air form KAKM, the PTV station in Anchorage, and (3) PBS programs received at an earth terminal owned by the University of Alaska directly from Westar I. The University of Alaska would record these programs, arrange them into a unified broadcast schedule, and transmit them to an RCA Satcom satellite for pick up by the "mini-TVs".

Appendix C

MSU

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

RESEARCH AND DEVELOPMENT. TELEPHONE (406) 994 2891
GRANTS AND CONTRACTS. TELEPHONE (406) 994 2381

MONTANA STATE UNIVERSITY
BOZEMAN, 59717. TELEPHONE (406) 994-2891

GENERAL INFORMATION - MSU TERM PROJECT

The acronym TERM stands for "Telecommunications in Education and Research for Montana" and is the title of a telecommunications development project initiated by the Office of Research and Development at Montana State University. The TERM Project is designed to demonstrate alternatives to the costly energy and time consuming travel traditionally involved in the delivery of MSU's outreach programs in education, research, and public service.

Initial funding for the project has been provided primarily by two major grants. One is from the Department of Commerce, Public Telecommunications Facilities Program (PTFP), and is for television production and dissemination equipment in the amount of $245,000. The other major grant provides supplementary funds for program production in the amount of $86,000 for the first year of a two-year grant and is from the M. J. Murdock Charitable Trust, Vancouver, Wa. For both of these grants, John W. Jutila, Vice President for Research, is Principal Investigator; Carl J. Hoffman, Vice President for Extension/Director, Cooperative Extension Service, and Jack A. Hyyppa, Director Television Center, are Co-Principal Investigators; and Elizabeth L. Hurley, Administrative Officer, Office of Research and Development, is Project Coordinator. Related grants include a regional Community Learning Center Project funded by the Western Rural Development Center and the Montana Health Sciences Library Network Project funded by the National Library of Medicine.

The Telecommunications System

Under the TERM Project, MSU will produce and distribute color videotaped television programs for use in communities throughout the state. Programs that are generally informational or cultural will be offered to cable companies and broadcasters in the state for use as public service programming for home viewers. Programs of a more instructional nature will be used in group presentations, workshops, and seminars in the communities. The group presentations will be coordinated by local site facilitators. These programs may be used in conjunction with a live interactive audio component providing direct communication between the presentor of the videotaped program and a number of group presentation sites around the state simultaneously. Interactive data communications will also be available to supplement the audio and video components through the use of the Cooperative Extension Service's AGNET terminals.

Since 1979 the PTFP grant requirements have been expanded to include non-broadcast entities as eligible applicants but the program does require access to an electronic means of dissemination. Technical arrangements for the distribution of MSU programs involve the use of the commercial microwave system owned by Western Microwave, Inc. Programs will be sent out over the microwave system late at night after regular programming has gone off the air. The programs will be taped in the communities on videotape recorders supplied by the grant and activated by tone decoders controlled by the MSU studio. The programs will then be available the next day for use on cable, for local broadcast, or for group presentations. Other communities not accessible by the microwave system will also be included in the network by simply mailing or busing tapes to them.

The cable companies involved in the initial phase of the project will be among those owned by Community Tele-Communications, Inc. that may wish to participate. Other cable companies in communities that can be accessed by the same microwave system will be included in the project as arrangements are made. Also, the programs will be offered to the independent cable companies and to the commercial broadcasters in the state who may be interested in carrying them as a public service. The PTFP grant provides for ten videotape recorders and tone decoders but additional communities could be accessed as well depending on the particular technical arrangements in each locality.

The interactive audio component of the system for use with the group presentation programs will be provided through the Educational Telecommunications System (ETS), a telephone teleconferencing system available under a cooperative arrangement with Eastern Montana College, Billings. The ETS will have 30 permanent installations around the state by mid-winter '81 and up to 20 portable units can be added to that system. The use of the ETS will provide private-line-quality voice communications between and among all of the sites involved in the group presentations and the instructor or program presentor. Consequently, videotapes of a program could be shown at a number of sites at an appointed time followed by live discussion and group participation.

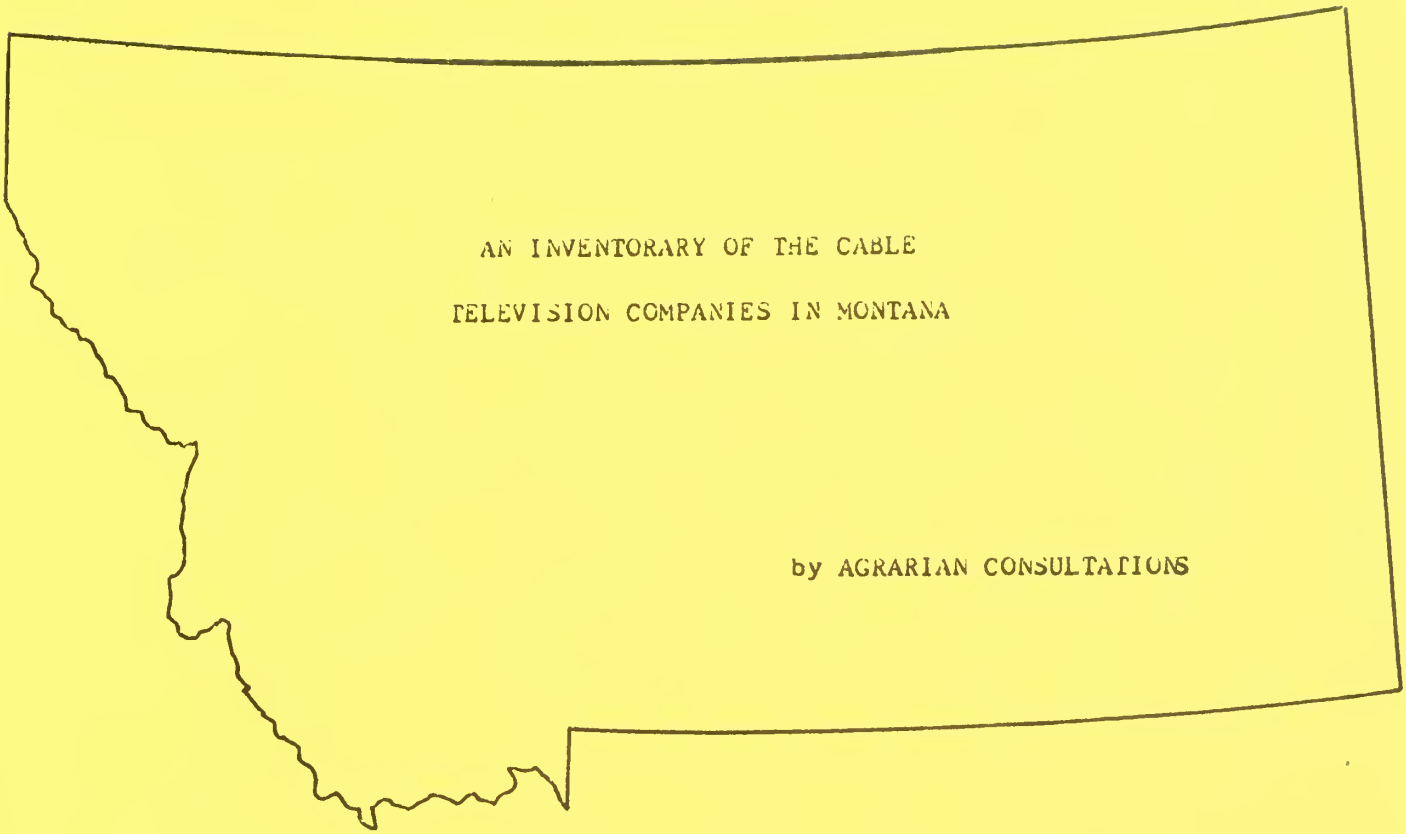
The communities participating in the project will each have a community advisory committee which will deal with questions of local site selection for group presentations, program interests and needs assessments, program evaluation, local promotion, and the designation of site facilitators. The County Agents have indicated enthusiastic cooperation with the project and will serve as key representatives for the University. In some cases they may be asked to serve as site facilitators.

TERM Programs

Programs for the TERM Project will be produced at the MSU Television Center and the costs of production will be supplemented by the Murdock Trust grant. These funds will be available to faculty members and program leaders on a regrant basis. A Request for Proposals from the Office of Research and Development details the guidelines for project funding. The four general areas of program interest outlined in the Murdock grant are: health, education, research, and public service. Programs may be designed for general public viewing or group presentation or both. A wide variety of programs and program arrangements will be selected for inclusion in the project in order to expose as many people as possible to the uses of telecommunications in providing University outreach services.

Identifiable needs assessments will be important criteria in the selection of initial programs. Since the TERM Project simply offers an alternative mode of delivery to traditional outreach activities, programs designed to respond to clearly established community needs will be given priority in the initial phase. As the project grows and familiarity with the system and its potential is realized, more extensive community needs assessment mechanisms will be established. The system itself is essentially a tool designed to respond to user needs with whatever resources the University can provide.

Funding for TERM programs will continue to be developed through grant and contract activity, fees for services where appropriate, and general University support. It is anticipated that in a relatively short time the cost effectiveness of this approach in the distant delivery of services will not only prove the project to be self-sustaining but will provide substantial cost savings for many traditional areas of University activity.



AN INVENTORARY OF THE CABLE TELEVISION COMPANIES IN MONTANA

by AGRARIAN CONSULTATIONS

AGRARIAN CONSULTATIONS

BOX 547
HARLEM, MT 59526
(406)353-4922

Charles Bickenheuser

June 1, 1981

Mr. A.E. Clifford, Director
Montana Telecommunications Project
Room 227
Mitchell Building
Helena, MT 59601

Dear Mr. Clifford:

Attached to this letter of promulgation is the final report for the Proposal to Inventory the Cable Television Companies in Montana. The report consists of ten sections:

1. Inventory of receiving and transmission systems
2. Production capabilities
3. Test and monitor equipment, and miles of plant
4. How a cable system works
5. Programs offered
6. Future expansion plans
7. Managerial and technical strength
8. Specific problems
9. Gross revenues
10. Presentation to a task force

During the requirement phase of this proposal section nine was not reported on due to the competitive nature of the cable television industry. Such a task would have placed this entire proposal in jeopardy.

Several of the above requirements are supported with schematic and serial documentation in the appendix.

Agrarian Consultations is confident that this document will prove instrumental to future planning efforts regarding the growth of telecommunications in Montana. Please feel free to contact me should you have any questions regarding this study.

Sincerely,

Charles Bickenheuser

CB:ak

Attachments

I N D E X

page

Letter of Promulgation

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Cable System Technical Block Diagram C

List of Important Totals . . . . . D

INTRODUCTION

Montana is moving, as are several other states, into the deployment and usage of telecommunications to effect a greater citizen response to business and government policies and decisions. A necessary first part of this task is to inventory the present communications systems within the state. As such, the inventory of Montana's cable television systems was one of several such systems to be inventoried. (Some other systems were commerical radio and television broadcast stations, land mobile, amateur radio and the like.) Accordingly, this proposal seeks to inventory most, if not all, of the cable systems in Montana. The information, reported in totals without reference to any single system, will be used for the design and implementation of future telecommunication systems in the state.

Agrarian Consultations wishes to thank the many individuals who gave so generously of their time, without whom this study could not have been done. In the interest of confidentially individuals cannot be thanked by name; though the thanks expressed is no less sincere even if given in general. Special thanks to the Montana Telecommunications Project Office and in particular to its director, Mr. A.E. Clifford.

EXECUTIVE SUMMARY

The purpose of this study was to carry out a comprehensive inventory and analysis of the cable television systems in Montana. This study fulfills part of a federal grant to the State of Montana to inventory and analysis the current use of state communications and develop a mulit-mode and multi-model telecommunication system for both our private and government areas as applied to the needs and capabilities of Montana residents.

Of the known 49 cable systems in Montana nine were inventoried on site and the remaining systems were inventoried by telephone. Without exception all of the systems had just completed a major expansion or were planning a major expansion in the next several months to a year. In some systems this included a rebuild to increase bandwidth for additional programing or simply the addition of more channels to the present system.

Managerial strength is strong with the average years of experience in cable television systems 10.40 years (standard deviation, or s.d., of 7.33) with the range from more than 26 years to just a few months. Technical strength is also strong with 47 percent of the technicians having received formal training in a technical school. Also 38 percent hold either a 2nd or 1st class FCC license. 22 percent gained

their technical training with on the job training without any prior, and formal, training. Technicians with a bachelors degree number six percent of the total and technicians who received electronic training in the armed services account for 28 percent of the total.

Those systems that are locally owned and operated tend to have smaller staffs and are located in the smaller towns of the state. In general their supporting populations are less than four thousand staff varies from two to five people. Multi system organizations (MSO's) are located in towns that have the larger populations in the state. Their staffs vary from five to twenty or more people employeed.

With the exception of local time and temperature channels and character generators locally programed Montana cable systems do not originate local programs. The one exception to this rule, more or less, is that one MSO has a portable production unit that can record video on three-quarter inch cassette. This portable unit is housed in a small trailer and is in use for legislative interviews during state sessions. The recorded tapes are then sent through the mail system in round-robin fashion for local play at each of the stations belonging to this particular MSO.

All of the MSO's can call for production equipment that is housed outside of the state. As a general rule this is use for program promotion on an infrequent basis.

This study found that management was enthusiastic about their work, the employment of recently introduced technology, system expansions and the addition of new programs. Most, if not all, shared an excitement in working with satellite systems. Some systems reported that supplies were longer in being deleivered, as a result of the rapid growth of cable systems in all of the states. Half of the systems reported a shortage of technical personnel.

Confidentially demands that the totals in the requirement sections be reported as a whole. It is the intention of this study that single stations, or individuals, not be identified. Such information as this report collects is not intended to give a market edge in the growth or sale of cable systems and this restriction does not interfere with the goals of the report; namely the future planning of telecommunication systems in Montana.

BACKGROUND

The past fifteen years have seen an incredible use of telecommunications systems in both government and private business. Cost reductions are on the order of one thousand to one. This trend towards audio and data telecommunication links has not yet reached its limit: in fact, it is just beginning. The social and economic facts of ever increasing telecommunication links demonstrates the publics need for more information and cost effective communications. In this regards Montana is now beginning to consider the use of telecommunications for its citizens. Recognizing the increased need to make more information and communication channels available Montana is planning for the future use of telecommunication systems that will give the 'person on the street' access to public officials and information that is now time consumming, often prohibitively so.

When any state or large organization begins this task one of the first items to be completed is an inventory of existing communication systems. Often sophisticated communications exist but are specialized for a particular usage and not for the general public. As a large, state wide, telecommunication system in the future would be to costly to deploy as an 'inhouse system' the use of existing communication systems, such as phone lines, launched

satellites, microwave links, television studios and the like, will be utilized as contract services and for technical and managerial support. Though online implementation is not without struggles the benefits, several times over, to the general public are substanistal and nourishing.

The use of video transmission systems in any future telecommunication system for the general public in Montana, especially one way, receive only video (except, of course, for the site of origination) of the type presently found in Montana's cable systems can be a valuable contribution. It is for this reason that this study, to inventory the states' cable systems, was undertaken. Not only were the technical transmission and receive aspects inventoried but also the technical and managerial skills were noted: for it will be the technicial and managerial skills of Montana residents in the cable systems that will make the use of video telecommunications for the general public successful.

It is the successful and useful experience of other states in the deployment of public telecommunication systems, such as the Alaskan system, and the need for such systems in Montana, that prompted this sutdy. The report follows.

INVENTORY OF RECEIVING AND TRANSMISSION SYSTEMS

Cable systems in Montana receive programs from three seperate transmissions systems: 1) satellite, 2) microwave and 3) off-air transmissions from local television broadcast stations (which is a requirement of the FCC). Additional programing can be taken from either video tape delay or local origination cameras; however, more than 98 percent of all programs received are taken from the first three systems. Specifically, 42 percent of received programs are from satellite down links, 35 percent are off microwave links and 23 percent of the total (not counting local time and temperature channels) are local, off-air broadcast stations.

All but four cable systems have a parabolic antenna for receiving satellite transmissions. 83 percent of the systems have either a 4.5 or 5.0 meter parabolic dish with the range between 4.5 meters to 10 meters. 98 percent of the cable systems inventoried have a single dish; the remaining two percent have two satellite antennas for those systems receiving direct satellite transmissions.

The transmissions systems that the cable systems themselves use to deliver their programs to local customers will covered in the

section entitled How a Cable System Works.

PRODUCTION CAPABILITIES

Production capabilities of most Montana cable systems are limited: only six percent of the systems can produce and air a program, either live or tape delayed, with equipment presently in the state. These are two camera studios with video editors, mike mixers, lights, character generators, and limited special effects (for split screen and fade to black). There is a portable studio in use on an infrequent basis: generally this is for legislative interviews every other year. Also one MSO can call of production equipment that is used between several states. When this MSO equipment is used in Montana it is for local program promotion to increase system subscribtions.

For the most part several stations (36 percent) air local 'time and temperature' status. This is done with a black and white camera that scans analog readouts of current weather conditions. Eleven percent of the systems have character generators locally programed. In general these are simple (less than 4,000 character memory) keyboard programmable units. Slightly less than a quarter of the systems (21 percent) have either a video tape player or recorder for

three-quarter inch cassette. Systems having both a video tape player and a character generator are eleven percent of the total.

The majority of Montana systems do not originate local programs of any type (time and temperature, delayed video, production studio). These systems number 64 percent of the total systems.

TEST AND MONITOR EQUIPMENT, AND MILES OF PLANT

All of the systems preform preventive maintenance and slightly more than half repair most equipment failure. Seven percent of the systems inventoried repair major equipment failures on site. 47 percent of the systems must send non-functioning equipment to another location in the state, or out of state, for repair as the technical skills and bench equipment are not on site.

As the radio spectrum in the four to six gigahertz is used to receive satellite and microwave signals for cable systems troubleshooting and repair of equipemnt operating in these frequencies demands sensitive and expensive bench test equipment and good technical skills only recently (in the cable television market) needed. For this reason MSO's have a regional repair office and independent systems send their equipment out rather than repair on site. Also, the down time of solid state, intergrated circuits is much less than the older gen-

eration of vacuum tube sets. This fact makes the purchase of expensive bench equipment for testing and repair not necessary for the smaller systems. Most systems, both small and large, have equipment that measures line levels, or signal strength, in the range of 50 to 170 megahertz and the audio range of 300 to 15, 000 hertz. This equipment is fairly inexpensive and can be used without a high degree of technical training.

Total miles of plant, or total miles of cable presently serving Montana cable subscribers, inventoried are 2564. The number of households connected to all Montana cable systems is 126,356. The number of households that could be connected to the present television cable system could be increased by as much as thirty percent without the addition of more transmission cable.

HOW A CABLE SYSTEM WORKS

A cable system works with the interweaving of managerial and technical skills. (See appendix pages A, B and C) Managerial organizations of the smaller stations varies from two to five people whereas the larger stations employee from five to twenty or more people. A generalized management block diagram for the smaller stations (Appendix A) shows that the system manager is in direct control of all system functions with very little auth-

ority being delegated to other staff except routine office procedure. It is important to note the the manager most likely is the chief technician also; in fact he may be the only technician. This is in contrast to the larger systems where the manager may or may not have a technical background, though in most systems the manager does have a technical history.

Other differences to note are that all of the larger systems are owned, at least in part, by a parent coporation. In contrast the smaller stations may or may not be owned by another corporation. (Appendix B)

Clearly cable systems hire whom they need in the way of personnel and what they can in terms of salary. If the system is large tasks are delegated to assistant managers or chief technicians. 26 percent of the systems have their billing computerized. Eleven percent have their inventory computerized in addition to their billing. Only one system has an in-house computer system; other systems use an out of state computer company (specializing in cable television systems) for batch processing.

As mentioned in the executive summary managerial strength is strong with the average manager having 10.40 years in the cable tele-

vision business. The range was from 26 years to just a few months. All of the managers were enthusiastic about their work and the cable television business. Working with satellite technology added excitement to the job. 'Espirit de corps' is strong for both small and large systems.

The technical aspects of a cable system are divided into three areas: 1) receiving the program signal, 2) feeding all of the program channels into the transmission line and 3) the transmission line itself. As mentioned in the section entitled Inventory of Receiving and Transmission Systems 98 percent of the programs are received either from satellite, microwave or off-air sources. For satellite or microwave programs (or channels) an antenna system is used to recover low power (generally less than ten watts) signals. A parabolic antenna, or "dish", is employeed at this antenna develops excellent gain (or amplification) of the received signal over beam antennas. Parabolic antennas can also be used as the received signal (four to six gigahertz) is a very short signal in its length of wave. (A signal of four gigaherts is less than three inches in length.) Parabolic antennas also receive less noise than beam antennas making the received signal 'purer'. The signal is captured by the parabolic antenna and feed into a receiver that increases its strength. This signal is then feed into a modulator that converts the four to six gigahertz signal to a lower frequency that can be used, ultimately,

by the television sets in the home of the subscriber. Microwave signals are received in the same way as satellite transmissions, except, of course, that the origin of the signal a cable company receives is from a land based system instead of a satellite. (Appendix C)

Off-air signals, from local broadcast stations, are captured on a beam antenna (their wave lengths are 18 to five feet in length) and feed into a signal processor that both increases, or amplifies, the received signal and, most often, modifies the frequency for use in the cable system. Some off-air signals are captured and amplified in the received frequency.

In Montana less than two percent of the programs originate from video delay or local studios. This in-house origination is modified in frequency, depending upon what channels are available, in the cable system itself. The exception to delayed video or live studio is a local 'time and temperature' channel aired by 36 percent of the cable systems.

Feeding of all the program channels into the transmission line(s) serving the subscribers is done through a 'combining network' that is either feed in series or parallel. This combining network sets

the signal level that is maintained throughout the entire transmission line(s).

PROGRAMS OFFERED

All of the major commerical networks (ABC, CBS, NBC) are offered to Montana cable customers. PBS is offered to 72 percent of the households; HBO to 81 percent; WTBS Alanta to 63 percent; CNN to 27 percent; Showtime to 31 percent; WGN Chicago to 28 percent; CBN to 92 percent (though only 39 percent offering this religious station do so for its entire broadcast day); C-SPAN to 12 percent; USA Network to 24 percent; ESPN to 29 percent. Other programs are offered less than two percent of the total program time.

There is one station in Montana that offers three to six hours weekly of live and tape delayed programing. This multi-variety of sports, public comments and interviews, news and humor is produced and aired by a Montana resident who does so for the enjoyment of the public and without salary. This particular cable station airs this variety show as a public service to its subscribers.

A few systems carry two or more independent stations under 'grandfather' clause or because they serve less than a thousand sub-

scribers. (Both situations are allowed under current FCC regulations.) This total is eight percent of all Montana cable systems. Systems who carry WTBS Alanta but not their sister news program CNN receive several request for this news service, in large part because WTBS actively promotes this program to its viewers.

Complaints and requests for additional programing balance each other: as many people, more or less, that want or object to a particular program are cancelled out by as many opposite requests. Many systems (31 percent) receive few to no requests or complaints. This situation is found only in the smaller, and mid size, systems.

As mentioned in other sections one MSO mails round-robin legislative interview video tapes thorogh its stations during the months when the State legislature is in session. These tapes are produced from a portable production studio, for the most part, from Helena.

FUTURE EXPANSION PLANS

All of the systems have just finished a major re-build and added additional program channels or are planning to do so in the next six months to a year. 77 percent of the systems carry, or can carry, twelve channels at present. The remaining 23 percent offer twenty or

more channels. In the next two years nearly 80 percent of all cable systems will offer more than 35 channels. A few systems may opt to carry as many as 55 channels. FCC deregulation will give many systems the green light in this regards (as the number of independent stations satellite down-linked is increasing) as well as use of the 'mid-band' (the frequencies between channels seven and eight).

Future expansion plans include the addition of another parabolic receiving antenna. For the most part Montana cable systems are not planning to add additional square footage or increase staff by more than two people during the next year. (31 percent said they palnned to add one or two people to their staff in the next year.)

MANAGERIAL AND TECHNICAL STRENGTH

Managerial strength has been covered in some detail in the section entitled How a Cable System Works. It is the intention in this section to focus upon the technicians who troubleshoot, add to and maintain the cable systems. Technicains need a good background in electronics to work with any hope of success, in today's cable systems. The least technical skill required is for 'installers'. Installers are the ones who connect, or disconnect, homes to the

transmission line of a system. However, in the smaller systems, the chief technician (who may also be the manager) may also be the one who installs new subscribers. In Montana 22 percent of the technicians gained their experience through 'on the job training'. Nearly half (47 percent) of the technicians were trained in technical schools and 28 percent received electronic training in one of the armed services. 38 percent of the technicians hold either a second or first class FCC license. Six percent hold bachelors degrees in electronics. One MSO offers an electronic home study course to all of its technicians and this same home study is mandatory for all new employees working in the technical areas of the systems, regardless of their background.

The technicians, for the most part, have a good background in cable systems, whether from OJT experience or formal schooling. It is noted that the technicians interviewed were interested and outgoing people. They enjoy their work and the cable television business.

SPECIFIC PROBLEMS

Though 31 percent reported a lack of space this situation was a temporary one due to system re-building. Fifty percent noted a lack of technical personnel. 54 percent were waiting on FCC deregulation to add additional program channels to their systems (independent

stations down-linked from satellites).

Fifty percent of the systems reported delays on shipment of supplies while 12 percent said that supplies were arriving ahead of schedule. One system noted a delay of intra-state shipments from the large population centers to the smaller towns.

Few systems, less than five percent, reported high rates of equipment failure. All noted that the new solid state equipment was superior in operational time to equipment that used vacuum tubes.

GROSS REVENUES

This requirement was requested, "if possible..." in the contract and, due to the competitive nature of an expanding, national cable television market, such a task would have placed this entire study in jeopardy. For this reason, and following several conversations with cable television managers at the beginning of this project, special care has been taken not to identify any single system or individual, or report any information regarding gross revenues.

As noted in the executive summary the restriction of not reporting gross revenues does not interfere with the goals of this project; namely the collection of information for the future planning of tele-

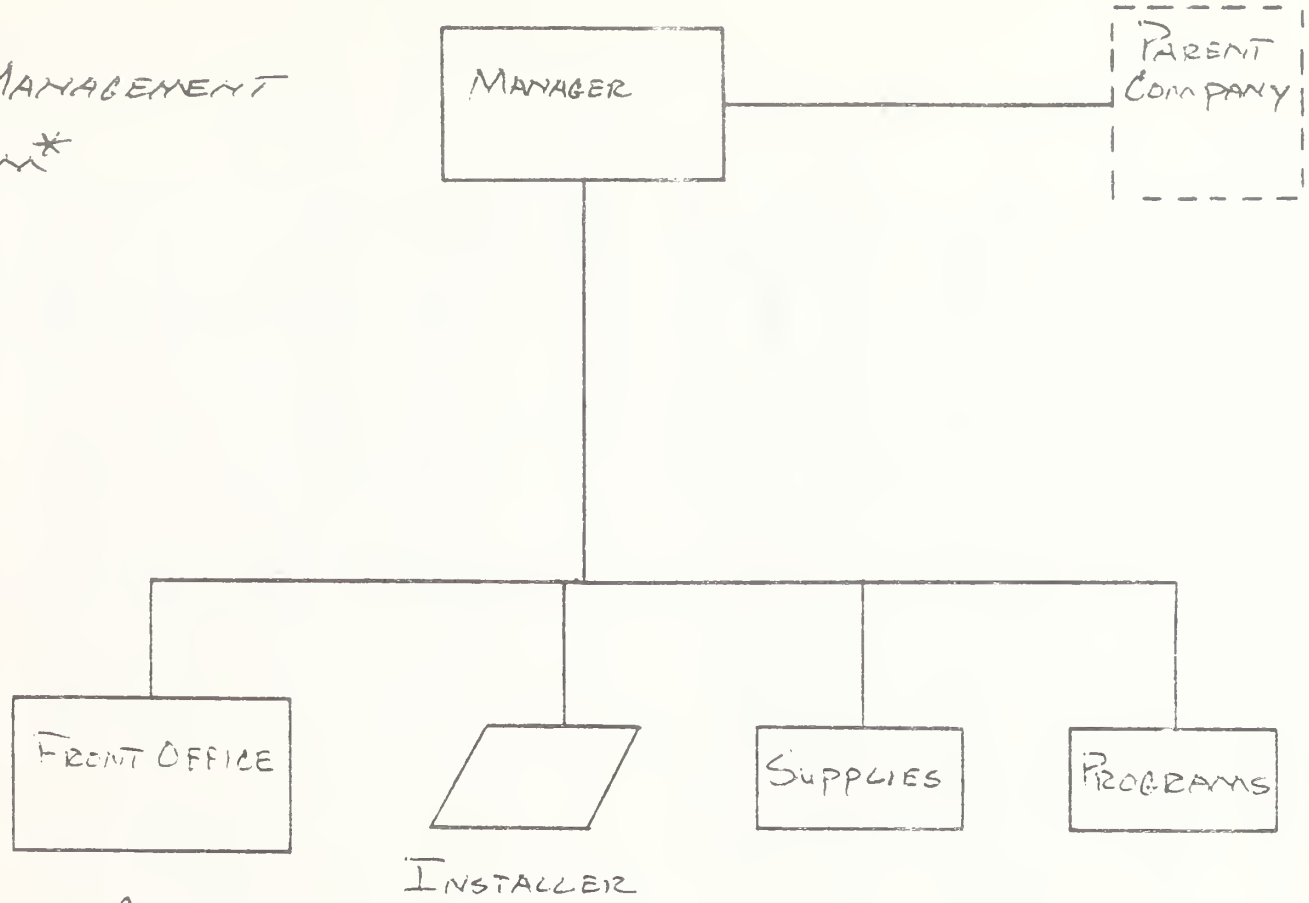
communication systems for the general public in Montana.

PRESENTATION TO A TASK FORCE

This project will be presented in full, to such task(s) force(s) as the Office of Telecommunications Project for the State of Montana may wish. The presentation will include several overhead projections in addition to the report and should take about one hour, depending upon questions from task force members.

APPENDIX A

GENERALIZED MANAGEMENT BLOCK DIAGRAM*

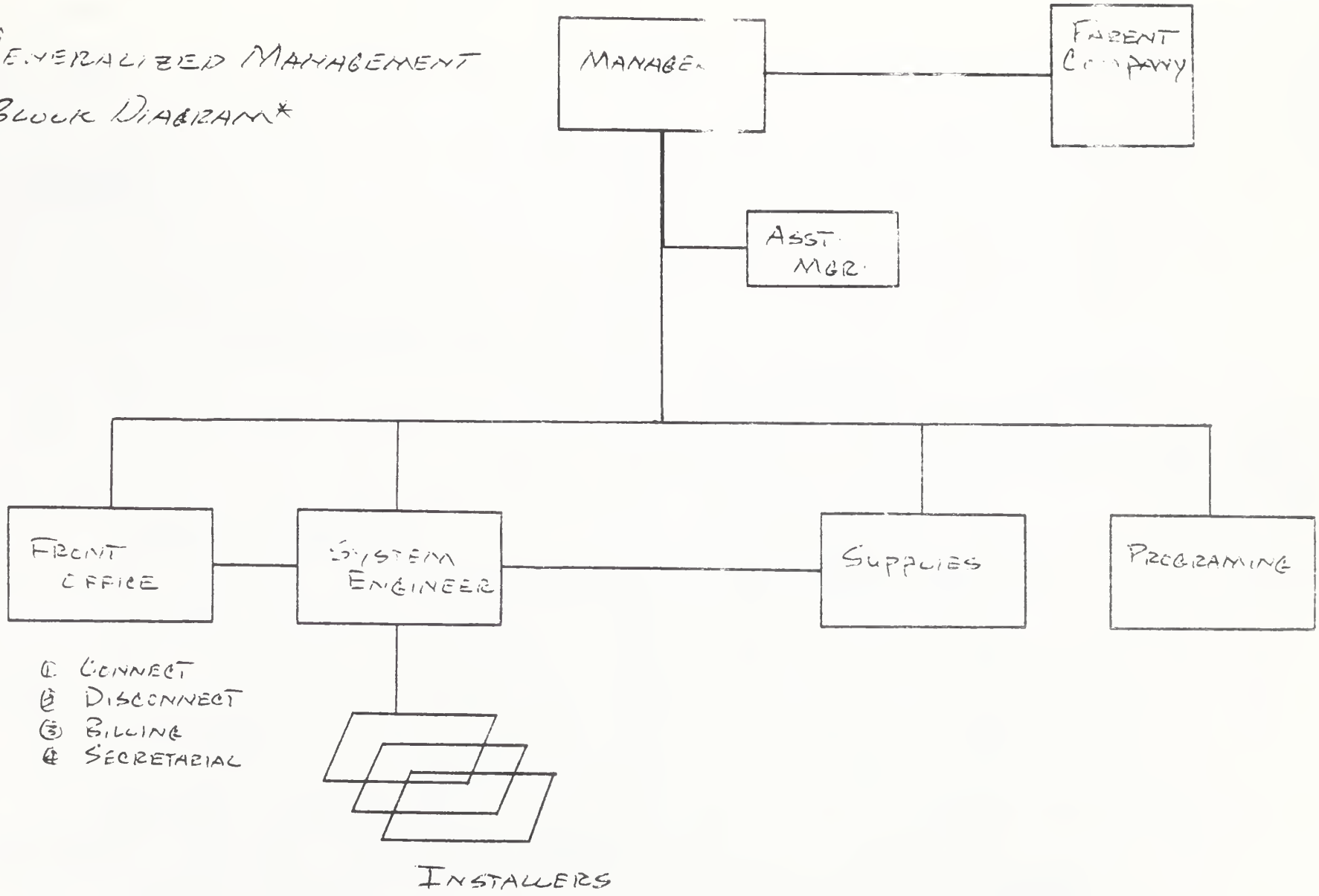


1. CONNECT
2. DISCONNECT
3. BILLING
4. SECRETARIAL

*CABLE SYSTEMS WITH LESS THAN SIX EMPLOYEES

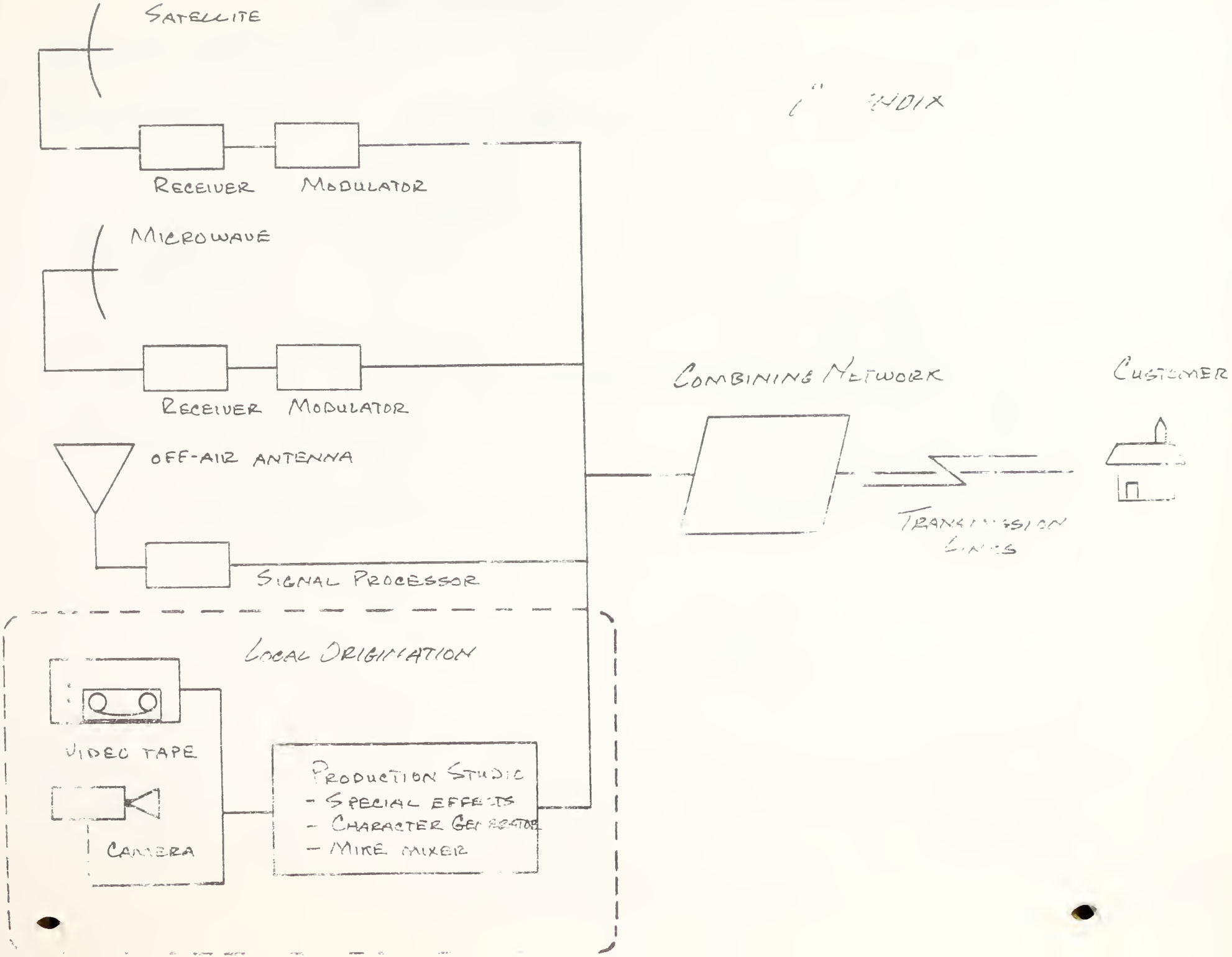
APPENDIX B

GENERALIZED MANAGEMENT BLOCK DIAGRAM*



*CABLE SYSTEMS WITH MORE THAN SIX EMPLOYEES

CABLE SYSTEM BLOCK DIAGRAM



APPENDIX L

LIST OF IMPORTANT TOTALS

	percent (numbers)
Number of production studios (live or delayed video)	6
Number of video tape players	21
Number of character generators	11
Number of systems having time and temperature channels . . .	36
Miles of cable (plant) in place	(2564)
Number of households on present cable systems	(126, 356)
Number of program channels received by satellite	42
Number of program channels received by microwave	35
Number of program channels received off-air	23
Number of systems having a single parabolic antenna	98
Average number of years a manager has in cable systems . . .	(10.40)
Number of technicians with training in a technical school . .	47
Number of technicians with training in military schools . . .	28
Number of technicians trained on the job	22
Number of technicians with 2nd or 1st class license	38
Number of technicians with a bachelors degree	6
Number of systems reporting a lack of technical personnel . .	50
Number of systems having their billing computerized	26
Number of programs originating from local systems (live or tape delayed)	2

cont'

Networks (percentage in all households)

ABC	100
NBC	100
CBS	100
PBS	72
HBO	81
WTBS Atlanta	63
CNN	27
Showtime	31
WGN	[illegible]
CBN (religious)	92
C-SPAN	[illegible]
USA Network	24
ESPN	29
all other	2 or less

Systems that carry, or can carry, twelve channels	77
Systems that offer twenty or more channels	23
Number of systems reporting a temporary lack of space (due to system re-building)	31
Number of stations reporting a delay in shipment of supplies	50
Number of stations reporting shipments ahead of schedule	12
Number of systems reporting a high rate of equipment failure	5

MEMBERSHIP ROSTER

MONTANA CABLE TELEVISION ASSOCIATION

February 2, 1981

ALBERTON
ALBERTON CABLE TV
Alberton, Montana 59820
[illegible] or B. Gates, Owner
722-4955

ANACONDA
ANACONDA CABLE TV
118 Main Street
Anaconda, Montana 59711
Phillip Watt, Mgr.
563-8201

BAKER
BAKER CABLE TV
906 S. 4th West
Baker, Montana 59313
Tom Overton, Mgr.
[illegible]-2937 or 778-2539

BIG FORK
See listing under KALISPELL
for TelePrompter Cable TV

BIG TIMBER
BIG TIMBER CABLE TV
Drawer C
Big Timber, Montana 59011
McLean A. Clark, Owner
932-2976, 932-2441, or 932-2971

BILLINGS
BILLINGS CABLE TV
1124 - 16th St. West
Billings, Montana 59102
Douglas Rice, Mgr.
248-1200

BOZEMAN
BOZEMAN CABLE TV
(also manages Belgrade system)
511 West Mendenhall
Bozeman, Montana 59715
Bob Briney, Mgr.
586-1837

BUTTE
BUTTE CABLE TV
201 East Front Street
Butte, Montana 59701
Douglas Striker, Mgr.
792-5329

CHINOOK
See listing under GREAT FALLS
for Vigilante Satellite Services

CHOTEAU
See listing under GREAT FALLS
for Vigilante Satellite Services

COLUMBIA FALLS
See listing under KALISPELL
for TelePrompter Cable TV

COLUMBUS
CENTRAL CABLE TV
P.O. Box 427
Laurel, Montana 59044
Les Hilliard
628-4290

CONRAD
See Listing under GREAT FALLS
for Vigilante Satellite Services

CROW AGENCY
See listing under HARDIN for
Crow Cable TV

CUT BANK
TELEPROMPTER OF CUT BANK
P.O. Box 836
Cut Bank, Montana 59427
Richard (Don) Cullen, Mgr.
873-2223

DEER LODGE
DEER LODGE CABLE TV
308 Milwaukee Avenue
Deer Lodge, Montana 59722
Lawrence B. Moody, Mgr.
846-1383

(over)

DILLON
DILLON CABLE TV
P.O. Box 1183
Dillon, Montana 59725
Ted Pinkerton, Mgr.
683-2110

EAST HELENA
See listing under HELENA
for Helena Cable TV

ENNIS
MADISON CABLE CO.
P.O. Box 1
Ennis, Montana 59729
Hugh Slowinski, Richard Jones
682-7213

FORSYTH
FORSYTH CABLE TV CO.
P.O. Box B
Forsyth, Montana 59327
Robert L. Schultz, Mgr.
356-7518 or 356-2784

FORT BENTON
See listing under GREAT FALLS
for Vigilante Satellite Services

GLASGOW
GLASGOW CABLEVISION
P.O. Box 407
Glasgow, Montana 59230
Bonnie Hansen, Mgr.
228-2445

GLENDIVE
GLENDIVE CABLE TV
P.O. Box 738
Glendive, Montana 59330
Frank E. Carpenter, Mgr.
365-4151

GREAT FALLS
TELEPROMPTER OF GREAT FALLS
P.O. Drawer 6848
Great Falls, Montana 59406
Walter C. McCall, Mgr.
727-8881

GREAT FALLS (continued)
VIGILANTE SATELLITE SERVICES
(systems in Chinook, Choteau,
Conrad, Fort Benton, Malta and
Townsend)
P.O. Box 2363
Great Falls, Montana 59403
Earl Granger, Mgr.
761-3427

HAMILTON
See listing under MISSOULA
for TelePrompter of Missoula

HARDIN
CROW CABLE TV
P.O. Box 338
Hardin, Montana 59034
Tom Zelka, Owner
665-2103

HARDIN CABLE TV
P.O. Box 362
Hardin, Montana 59034
Jim Luttschwager, Mgr.
665-2859

HARLOWTON
CABLE TV OF HARLO
P.O. Box 582
Harlowton, Montana 59036
Donald L. DeShaw, Owner
632-4300

HAVRE
COMMUNITY TV, INC.
P.O. Box 391
Havre, Montana 59501
Stanley G. Stephens, Owner
265-1120

HELENA
HELENA CABLE TV
(also manages East Helena system)
P.O. Box 5509
Helena, Montana 59601
Wes Huffman, Mgr.
442-6221

KALISPELL
TELEPROMPTER CABLE TV
(also manages systems in Big Fork, Columbia Falls, Polson, Whitefish)
333 First Avenue East
Kalispell, Montana 59901
Ken Young, Mgr.
755-7202

LAUREL
RATTLESNAKE CABLE TV
(also manages Rattlesnake system in Missoula)
P.O. Box 427
Laurel, Montana 59044
Les Hilliard, Owner
[illegible]

LEWISTOWN
LEWISTOWN CABLE TV
P.O. Box 638
Lewistown, Montana 59457
Ernie Hruska, Mgr.
538-3818

LIVINGSTON
[illegible] CABLE TV
203 South Main
Livingston, Montana 59047
Randolph Bailey, Mgr.
222-0232

MALTA
See listing under GREAT FALLS for Vigilante Satellite Services

MILES CITY
MICRO TV, INC.
P.O. Box 489
Miles City, Montana 59301
Tom Glendenning, Mgr.
232-2421

MISSOULA
TELEPROMPTER OF MISSOULA
(also manages Hamilton system)
P.O. Box 5327
Missoula, Montana 59806
Larry T. Brodie, Mgr.
728-4205

RATTLESNAKE CABLE CO., INC.
See listing under LAUREL for Laurel Cable TV

PHILIPSBURG
PHILIPSBURG CABLE TV
P.O. Box 40
Philipsburg, Montana 59858
Donald Henke, Owner
563-6600

PLENTYWOOD
PLENTYWOOD CABLE TV
P.O. Box 128
Plentywood, Montana 59254
Ernest Berland, Mgr.
765-1199

POLSON
See listing under KALISPELL for TelePrompter Cable TV

RED LODGE
RED LODGE CABLE TV
P.O. Box N
Red Lodge, Montana 59068
Roger Williams, Owner
446-1880

SHELBY
TELEPROMPTER OF SHELBY
(managed from Cut Bank Tele-Prompter office)
Box 836
Cut Bank, Montana 59427
Richard (Don) Cullen, Mgr.
873-2223

SIDNEY
SIDNEY CABLEVISION
(also manages Wolf Point system)
208 - 2nd Avenue S.E.
Sidney, Montana 59270
Walter Horton, Mgr.
482-3613

TOWNSEND
See listing under GREAT FALLS for Vigilante Satellite Services

WHITEFISH
See listing under KALISPELL for TelePrompter of Kalispell

WOLF POINT
WOLF POINT CABLE TV
See listing under SIDNEY for Sidney Cablevision

A SURVEY OF MONTANA TELEVISION TECHNOLOGY

Prepared For:

MONTANA TELECOMMUNICATIONS PROJECT

Department of Administration
Helena, Montana

June, 1981

By:

Montana Institute for High Technology Applications
Missoula, Montana

ATTACHMENT E

PART I

EXECUTIVE SUMMARY:

A SURVEY OF MONTANA TELEVISION TECHNOLOGY

The Montana Telecommunications Project is presently assessing all aspects of Montana's telecommunications structure, including television technology. The following report summarizes a survey which studied and assessed the extent of television activity within Montana's Departments of State and surveyed Montana Broadcasters and independent production houses. While the survey inquired into three areas of television activity, the bulk of time and effort was spent describing holdings and needs of Montana's Departments of State. The survey was performed through a survey document, personal interview and telephone survey; while the effort had description as its goal, the information obtained can form a basis for making observations and recommendations to the Telecommunications Project and, particularly, the Television Task Force.

State Holdings

Besides the need to inventory state holdings, the answers to two "unknowns" was sought: 1) how extensively was television technology use? and 2) how well acquainted were agencies with television's potential to serve information and instructional needs?

While holdings, in most circumstances, are not state-of-the art, units within Departments of State use what technology they have. Most have used television long enough to understand how the technology can serve the unique needs of their agencies. In most circumstances, agencies reported a need to upgrade holdings or complete systems; however, the majority of respondents noted that new technology alone would not cause an increased use of television: unless more staff is assigned to units using television, use patterns would remain constant. Based on the expressed need agencies have to upgrade holdings and on those few agencies expressing a desire to expand activity, it is probable that Montana Departments will be purchasing a signifigant amount of hardware over the next few years.

Based on the reported needs and use patterns, the following observations and recommendations might be made:

1) The information derived from the survey does not conclusively argue for a centralized television production system for state agencies. While most agencies can justify simple cameras and recording systems, few can justify exclusive ownership of editing and signal processing systems. Hence, if centralized systems are contemplated, they should be designed with an eye to offering critical but occasional needs which agencies have for services such as editing, other signal processing, duplication, format transfers, etc.

2) Except for the rare television broadcast documentary, virtually all of the reported agency use centered in the industrial-educational area. Based on use, it would be difficult for an agency to argue the need for expensive broadcast quality cameras when less expensive high grade industrial products will supply a signal proportional to the contemplated product: a centralized system might have high quality cameras available for the occasional use by all agencies, as it might have high quality editing available.

3) While use patterns do not argue for expensive cameras and recording gear, patterns do indicate that it would be difficult to maintain effort without having a camera and

recording systems located at agencies who use television.

4) Agencies reporting use have voiced a preference for either one or another of the video cassette tape machine formats, before either format types are purchased in large quantities, standardization of the machine format should be pursued by agencies contemplating purchases.

5) Based on most agencies willingness to discuss sharing of new acquisitions and pursuing other common efforts, a vehicle of some sort should be put in place to promote communications between users and to promote development of common coherent acquisition plans and production goals.

6) While state personnel who use television appreciate its potential, the survey did not indicate that television was well understood at the higher administration levels of many agencies. Some effort should be made to provide information and orientation to that level of agency activity.

University Holdings

With the exception of Montana's two Universities, television activity is not extensive. With the exception of Eastern Montana College, the instructional television units responsible for delivering product can do so with coherent, if not obsolete, TV production systems.

Because each campus is unique, it is difficult to propose unified activity, though common sense might dictate that units can jointly determine a common instructional television production format that would allow for identical or compatable cameras, editors and duplicating formats.

Broadcasters & Independent Producers

Montana television is small market television. The functional descriptions of the stations listed in the report are descriptions of the standard small market operation.

With two exceptions reported from Great Falls, Montana's independent television production companies are small and marginal efforts. It has been noted, for the last decade, that for-profit production companies seldom find enough work to maintain continuous business activities; it would seem that little has changed in the last ten years. Of the companies surveyed, none has been in business--television--for more than 5 years. The companies surveyed represent a fresh attempt to find a survival

formula for independent television production in Montana: in the last decade 5 companies known to the author have failed after an average three years of activity. If patterns hold true, with the exception of the Gt. Falls companies, the prognosis is not favorable.

The Survey Report concludes a 10 week effort to assess Montana's television technology. It is a modest technology, attempting to maximize effort with a minimum of state-of-the art technology.

ATTACHMENT E

PART II

INTRODUCTION:

AN OVERVIEW OF MONTANA'S TELEVISION PRODUCTION TECHNOLOGY

In 1980, the National Telecommunication Information Agency, NTIA, within the U.S. Department of Commerce, awarded a grant to Montana's Department of Administration, Communications Division, to study Montana's telecommunications needs. The resultant "Montana Telecommunications Project" is presently assessing all aspects of Montana's telecommunications structure, including television technology.

One component of the proposal submitted to the NTIA in Washington was to survey, study and assess the extent of television activity within Montana's Departments of State. Since the funding of the proposal, this study and assessment component has been expanded to include a description of the production activities and capabilies of Montana's television broadcasters and private television production companies: in effect, the mandate was expanded to 'discover' and 'describe' television production activity wherever it could be found, within the categories mentioned.

The period of time alloted to conduct the agency survey and other elements with a final report was seven weeks. Given a compressed time-line, the objectives of the survey for each of the three components differed, as did method; however all of the objectives described below centered on arriving at functional descriptions of those surveyed.

I The objectives of the Department of State survey were:

1) To inventory holdings of equipment which were on-line or on order

2) To describe how the equipment was configured

3) Describe policies in force regarding the sharing or use of the equipment by other agencies.

4) Describe future equipment needs

5) Investigate whether agencies were interested in pooling resources to purchase,in common, television hardware and describe what conditions might attend common hardware use.

For Departments of State with Helena headquarters, a survey document which had been under development was finalized and used to gather the information. Besides the formal document, in-depth interviews were conducted with agencies which evidenced the most extensive use of television or stated their intention to do so. On the theory that film formats provide material for television programing, 16 and 35mm holdings were surveyed.

Units of the University System were surveyed, though not with the same document used for departments. It was assumed that University units would hold equipment which ranges from true 'musuem' pieces to state-of-the-art hardware; interviews with University units focused on acquiring the information necessary to describe on-line equipment and use patterns.

Montana Broadcasters were interviewed with the following purposes in mind:

1) To describe production capability in a functional way, noting special features of each system

2) To describe the special requirements for pre-production, production and post-production which each studio might have

3) Describe locally originated programing

4) List contacts within management in sales, general management, production, etc. for the benefit of prosepective users.

Independent production houses were surveyed in order to describe production capability and to list, with the consent of the principals, noteworthy programs produced by the company.

PART ONE: DEPARTMENTS OF STATE

In Appendix 1-A is the survey document used to gather information from agencies headquartered in Helena. Twenty-three Departments and Offices of State were surveyed of which 10 were found to hold television equipment within 21 subdivisions; an additional six subdivisions or Departments hold only 16 or 35mm photography equipment.

Initial contact was made by phone to determine where video equipment was held, followed by hand delivery of the survey document to state personnel having knowledge of or administering video holdings: on the average, three telephone contacts were made to each Department or Office before an appropriate contact person was found. Within 5 days of the delivery of the document to respondents, telephone followup occured, this, followed by a personal visit to retrieve completed surveys: twenty eight surveys were distributed; 27 were returned. It was left to the contact persons within the agencies to determine where the document would find its home, sometimes a survey would migrate, in the Department of Institutions the survey questions were sent over the Department's teletype to outlying hospitals and homes with answers returned by the same mode, and a xerox of the survey migrated to the Terry Schools and was returned in completed form.

In Appendix 1-B are found the breakouts of each survey question. Answers have been taken out of document sequence and clustered according to:

i major video holdings, cameras, monitors, machines, & significant accessories

ii equipment use

iii future equipment needs

iv inter agency sharing & willingness to acquire future hardware jointly

v 16 & 35mm film activity

Because the survey document was not designed to quantify results, many questions were open to interpretation by those completing the form. At times respondents did not answer certain sections of the survey, which, for tabulation purposes, have been taken to mean "no," "no holdings," or "not applicable": in few instances were the questions misunderstood.

i Equipment Holdings

Of the 43 television sets reported, few are R.F. channel receivers exclusively; agencies prefer full television monitors: 29 are black & white, 14 color; screen size averages in the high teens; of brands listed, japanese models outnumber domestic brands by 14:1.

Fifty videotape machines are distributed throughout the agencies: One old format BVH 1 inch sony was reported, as were 17 ½ inch reel-to-reel black & white machines; 30 3/4 inch cassette color machines and 2 ½inch color cassette player/recorders were also listed.

One reel-to-reel ½ inch black & white editing system was noted at Training Rehabilitation Information Center at Social Rehabilitation Services. One 3/4 inch editing system was reported by the Renewable Energy Bureau at Conservation and Natural Resources.

Fourty-one television cameras were listed, 13 of which were color--the majority of which were held by Employment Security Division in its Job Service and Training offices. 10 X 1 lenses were scarce with 4-6X1 lenses dominating. It would seem that maintenence of hardware generally occurs after catastrophic failure.

With the exception of Fish, Wildlife & Parks, no sophisticated tripods were reported. Very few agencies have adequate lighting, though most video users have microphones.

ii Equipment Use

Respondents were asked to classify their use of video within five categories:

1. In-house training
2. Documenting speakers
3. Making Public Service Announcements for Television
4. Making television documentaries
5. Preparing television presentations for public meetings

While the question allowed for more than one answer, only one agency reported up to 4 uses for the hardware: 16 respondents use television for in-house training; 11 for documentation; 2 produce Public Service announcements; 3 produce video documentaries for television and 11 use television for presentations at public meetings: 2/3 of the respondents use television for at least two purposes almost half stated three.

Patterns of use seem dependent on a one-to-one correspondence between equipment and original purpose of purchasing the hardware; it is uncertain whether the absence of sophisticated technology is a factor in patterns of use. The survey inquired into frequency of the use of major equipment items; patterns of response would indicate that television is used primarily for playback of prerecorded material: 9 respondents answered that playback was used Daily or weekly; 4 averaged a monthly use with the remainder reporting a non-patterned or infrequent use. In contrast to video machines and monitor use, no agency reported daily camera use: 3 reported weekly; 4 monthly; the remainder reported non-patterned or infrequent use. Less frequent camera use might be dependent on the fact that only one agency reported having full time staff available to the video area: SRS's Training Rehabilitation Information Center. Other agencies have reported that no personnel are assigned or that information officers or other staff are assigned on a very part-time basis.

The most extensive utilization of television is found within the Department of Labor & Industry, Social Rehabilitation Services and in the hospitals administered by the Department of Institutions.

Since the Department of Labor holds the majority of color cameras reported, black & white television production predominates among the respondents. While most respondents reported holding 3/4 inch color cassette video machines, the majority of them are old format with non standard frequency and transport velocity; such timing errors do not cause problems for industrial use, but are problems for television broadcast purposes--newer 3/4 inch machines have corrected these timing errors.

Few agencies reported having set aside permanent viewing or production space; though most have furniture to move the gear within the agency.

From the survey answers it is obvious that the use of television technology by respondents is a simple straightforward use.

iii Needs

In most instances, the equipment needs listed expressed the respondents' desires to upgrade their old formats rather than expand holdings. Three agencies expressed a need for a total of 9 color monitors; six, collectively require 12 color cameras and 6 agencies require the following types of videotape machines:

1	field portable	3/4	inch machine
2	" "	1/2	" cassette machines
7	console	1/2	" " "
8	"	3/4	" " "
1	"	3/4	" editing system

In expressing needs for cameras and monitors, respondents did not list models. The needs expressed for a variety of video machine formats reflect the national confusion: tape machine formats each have advantages and disadvantages based on quality vs cost, portability, engineering and signal standards, etc., etc. Given the recent announcements of high speed 1/2 inch and 1/4 inch cassette formats, the confusion of standards will become worse.

Equipment poor agencies frequently borrow; of 21 respondents, 12 receive periodic requests from other agencies for the loan of their equipment. Of the 10 respondents who lend gear, 3 lend on a monthly average, 3 lend quarterly and 4 report no pattern. Conditions placed on lent equipment are not stringent; most agencies

expect the borrower to take excellent care of the lent items and repair or replace the same if damaged. Several agencies have reported bad experiences with lending and have limited their lending or have required the borrower to use the gear within the agency premises.

The Office of Public Instruction rents its equipment to agencies in the Helena area. With the exception of OPI, no other respondent reported placing a charge on lent gear.

iv Sharing Future Purchases

Two survey questions dealt with sharing future video purchases:

1. For future purchases would you be willing to acquire hardware jointly with another agency and share the item?
2. What special conditions would you set for joint purchase of the item?

To the first question, 5 respondents gave no answer, 2 replied "not applicable", 1 stated it wasn't permitted due to grant regulations, 5 answered no, and respondents in the following agencies said yes:

	n
Department of Justice	2
Social Rehabilitation Service	1
Natural Resource & Conservation	2
Institutions	2
Health & Environmental Sciences	1
	8 yes

Those respondents willing to consider joint purchase listed few special conditions:

a) The Highway patrol listed conditions as "unknown"
b) The Law Enforcement Academy would require that equipment be available to law enforcement units
c) SRS's Training Rehabilitation Information Center had not set conditions at this time
d) The Renewable Energy Bureau at DNRC would require compatable and complimentary hardware to fit their 3/4 inch editing system
e) DNRC's Land Use Planning Division has not decided
f) Institution's Eastmont Training Center in Glendive has left the matter to be worked out
g) Corrections would require 50% use time
h) Health & Enviromental Science's Solid Waste Management Bureau listed "none"

One should not conclude from the respondent's listing of such few conditions that joint purchase would be realized easily; video users have specific purposes in wanting hardware and have specific formats in mind, not to mention the potential for complications arising at any level within a department's management component. While joint purchase agreements would take time to formulate, the discovered pattern of generous lending, by most units holding video, argues, that if joint purchase and use policies are pursued in the same spirit as lending policies, this option might prove a cost effective way to upgrade hardware.

v 35 & 16mm Film

With few exceptions, all respondents own and use the 35mm format. 35mm use repeats the types and priority of use reported for television: 15 respondents use 35mm for staff training; 13 use slides for public meetings and 4 use 35mm for Public Service Announcements. Compared to one respondent's having staff for video production, 10 report staff assigned to produce 35mm materials. Few respondents report contracting out 35mm work: 4 report infrequent contracting.

Two agencies reported 16mm holdings. The Commissioner's Office of the Department of Lands has 16mm which is infrequently used; Fish & Game has extensive holdings in 16mm and has staff support assigned to produce Public Service Announcements, at least one documentary for television per year, to document field work and to use film for public instruction. Fish & Game is the only respondent to report film editing capacity, sound sync recording & playback, sound mixing and synchronos film-sound playback. Fish & Game's accessories are of fine professional quality.

IN DEPTH FOLLOWUP

SURVEY CONTACTS-STATE AGENCIES

STATE BOARD OF EDUCATION	
Museum Project	Patty Dean 449-2694
FISH AND GAME	
Film Center	Mike Gurnett 449-2733
HEALTH AND ENV. SCIENCES	
Film Library	Robert Solomon 449-3444
Solid Waste Mngt. Bureau	Charles Woods 449-2406
DEPT. OF HIGHWAYS	
Personnel Division	LeRoy Broughton 449-2073
Preconstruction	Dave Morgan 449-2495
DEPARTMENT OF INSTITUTIONS	
Alcohol & Drug Abuse Div.	Stancliff 449-2872
Warm Springs	Keith RosenLean ext 2295
Boulder River School	Stuff Derel ext 330
Eastmont Training Center-Glendive	Cindy 365-6001
Galen	Dan 693-2811
Corrections	James Burgeos
DEPT. OF JUSTICE	
Highway Patrol	Matt Miller 449-3000
Law Enforcement Academy	Bob Kuchenbrod 449-3800
LABOR AND INDUSTRY	
Employment Security Div.	Russ Perry 449-2638
Worker's Compensation Div.	Carla Smith or Andrew Kiely 449-3182
Centralized Services for Employment Training and Compliance	Bill Salisbury 449-5600
NATURAL RESOURCES AND CONSERVATION	
Renewable Energy Bureau	Tom Livers 449-4624
Land Use Planning Div.	Mary Hatley 449-4600
SOCIAL AND REHABILITATION SERVICES	
T.R.I.C.	Ted Spas 449-5647

OFFICE OF PUBLIC INSTRUCTION Library Media Component	Gladys Bloom 449-3120
ADMINISTRATION Communications Div.	Ted Whitling 449-2586
DEPT. OF AGRICULTURE Directors Office	Mary Evans 449-3144
OFFICE OF THE GOVERNOR	Dave Wanzenreid 449-3111
DEPT. OF LANDS Commissioner's Office	Leanna Gober 449-2074
DEPT. OF HIGHWAYS Photo Unit	Travis Smith 449-2432
Travel Promotions	Gary Wunderwald 449-2654
DEPT. OF JUSTICE Fire Marshal	S. Clause 449-2050
Criminal Investigation Bureau	no contact 449-2769
Board of Crime Control	C. Bain 449-3604

INTRODUCTION:

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In 1980, the National Telecommunication Information Agency, NTIA, within the U.S. Department of Commerce, awarded a grant to Montana's Department of Administration, Communications Division, to study Montana's telecommunications needs. The resultant "Montana Telecommunications Project" is presently assessing all aspects of Montana's telecommunications structure, including television technology.

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1) To describe production capability in a functional way, noting special features of each system.

2) To describe the special requirement for pre-production, production and post-production which each studio might have.

3) List contacts within management for the benefit of prospective users.

Twenty of production houses were surveyed in order to describe production capability and any other special features they might have; a representative sample was sought.

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i major video holdings: cameras, monitors, machines and significant accessories.

ii equipment use

iii future equipment needs

iv inter agency sharing & willingness to acquire future hardware jointly

v 16 & 35mm film activity

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Fifty videotape machines are distributed throughout the agencies: One old format BVH 1 inch sony was reported, as were 17 ½ inch reel-to-reel black & white machines; 30 3/4 inch cassette color machines and 2 ½inch color cassette player/recorders were also listed.

One reel-to-reel ½ inch black & white editing system was noted at Training Rehabilitation Information Center at Social Rehabilitation Services. One 3/4 inch editing system was reported by the Renewable Energy Bureau at Conservation and Natural Resources.

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The most extensive utilization of television is found within the Department of Labor & Industry, Social Rehabilitation Services and in the hospitals administered by the Department of Institutions,

The color cameras reported are not distributed evenly--the majority are held by Labor & Industry, hence black and white television production predominates among respondents. While most respondents report holding 3/4 inch color cassette video machines, the majority of these are old format, having non-standard color frequency signals and velocity problems: such timing errors do not cause problems for industrial use, but are problems when a recorded signal has to be time base corrected for broadcast. The newer 3/4 inch machines held by agencies do not have these problems.

Few agencies reported having set aside permanent viewing or production space; though most have furniture to move the gear within the agency.

From survey answers, it is obvious that the use of television technology by respondents is a simple straightforward use.

iii Needs

In most instances, the equipment needs listed expressed the respondents' desire to upgrade their old formats rather than expand holdings. Three agencies expressed a need for a total of 9 color monitors; six require a total of 12 color cameras and six agencies require the following types of videotape machines.

1	field portable	3/4	inch	machine
2	" "	1/2	"	cassette machines
7	console	1/2	"	" "
8	"	3/4	"	" "
1	"	3/4	"	editing system

In expressing needs for cameras and monitors, respondents did not list models. The needs expressed for a variety of video formats reflect a national confusion: tape machine formats each have advantages and disadvantages based on quality vs cost, portability, engineering and signal standards, etc. Given the recent announcements of high speed 1/2 inch and 1/4 inch cassette formats, the confusion of standards will become worse.

Equipment poor agencies frequently borrow; of 21 respondents, 12 receive periodic requests from other agencies for the loan of their equipment. Of the 10 respondents who lend gear, 3 lend on a monthly average; 3 lend quarterly and 4 report no pattern. Conditions placed on lent equipment are not stringent; most agencies

expect the borrower to take excellent care of the lent items and repair or replace the same if damaged. Several agencies have reported bad experiences with lending and have limited their lending or have required the borrower to use the gear within the agency premises.

The Office of Public Instruction rents its equipment to agencies in the Helena area. With the exception of OPI, no other respondent reported placing a charge on lent gear.

iv Sharing Future Purchases

Two survey questions dealt with sharing future video purchases:

1. For future purchases would you be willing to acquire hardware jointly with another agency and share the item?
2. What special conditions would you set for joint purchase of the item?

To the first question, 5 respondents gave no answer, 2 replied "not applicable", 1 stated it wasn't permitted due to grant regulations, 5 answered no, and respondents in the following agencies said yes:

	n
Department of Justice	2
Social Rehabilitation Service	1
Natural Resource & Conservation	2
Institutions	2
Health & Environmental Sciences	1
	8 yes

Those respondents willing to consider joint purchase listed few special conditions:

a) The Highway patrol listed conditions as "unknown"
b) The Law Enforcement Academy would require that equipment be available to law enforcement units
c) SRS's Training Rehabilitation Information Center had not set conditions at this time
d) The Renewable Energy Bureau at DNRC would require compatable and complimentary hardware to fit their 3/4 inch editing system
e) DNRC's Land Use Planning Division has not decided
f) Institution's Eastmont Training Center in Glendive has left the matter to be worked out
g) Corrections would require 50% use time
h) Health & Enviromental Science's Solid Waste Management Bureau listed "none"

That agreement with agencies, regarding sharing, would be an easy matter does not follow from respondents' listing such few conditions regarding sharing: video users have specific purposes in mind regarding equipment and formats, also, the potential for complications arising at levels within a Department's management component always exists. If joint purchase agreements could be pursued in the same spirit of cooperation which lending policies exhibit, then, joint purchase and pooling might be a cost effective alternative for Departments.

v 35 & 16mm Film

With few exceptions, all respondents own and use the 35mm format. 35mm use repeats the types and priority of use reported for television: 15 respondents use 35mm for staff training; 13 use slides for public meetings and 4 use 35mm for Public Service Announcements. Compared to one respondent's having staff for video production, 10 report staff assigned to produce 35mm materials. Few respondents report contracting out 35mm work: 4 report infrequent contracting.

Two agencies reported 16mm holdings. The Commissioner's Office of the Department of Lands has 16mm which is infrequently used; Fish and Game has extensive holdings in 16mm and has staff assigned to produce: Public Service Announcements, at least one documentary for televising per year, documentation of field work, and production of public education materials. Fish & Game is the only respondent to report film editing capacity, sound sync recording and playback, sound mixing and synchronos film-sound playback. Fish & Game's accessories are of fine professional quality.

IN DEPTH FOLLOWUP

Returned surveys allowed for select in-depth interviews with agency respondents reporting a more-than-occasional use of video, or, the desire to do so. Time constraints did not allow every respondent in this classification to be intervied in person;

in Appendix I-C are the names of respondents and agencies interviewed, accompanied by short descriptions of their television activities: six in all.

Interviews with respondents were informal and addressed the following [illegible]

1) it was assumed that, in most circumstances, agency holdings would not be state-of-the-art; the interviewer inquired whether state-of-the-art-technology would make a difference by increasing the utilization of television by the agency.

2) Industrial television offers cost benefits by reducing travel time and expense; also it will allow a more effecient use of key training personnel. The interviews sought to determine the respondent's attitudes toward this factor.

3) Television production depends upon a variety of skills seldom found in the same person; given few reported FTE's assigned by agencies to this area, personnel needs were discussed.

4) Invariably, the interviews revealed the priority which television has been given by respective Departmental Administrations.

5) Agencies interviewed were those expressing a willingness to discuss sharing the costs of new hardware acquisitions. More details were sought.

State of the Art Technology

In most circumstances, the availability of state-of-the-art technology would make a difference to those interviewed. Qualified exceptions to this inquiry were made by Fish & Game and Health & Environmental Sciences. In the case of Fish & Game, it was noted that the capital investment in film and its superior portability in many field situations would keep 16 mm alive and well. However, video was recognized as a time saving device for Public Service Announcements and various education programs. The film center at Health & Environmental Sciences is, primarily, a distribution & duplication operation. Present holdings could stand refinement, however, within operational constraints, new gear would not substantially effect operations.

For the Department of Institutions, state-of-the-art technology would mean the opportunity to standardize formats and allow for more effecient use of software; new technology probably would not increase in-house production.

For respondents in Justice, DNRC and SRS, new technology would not only upgrade present capacity, but also allow for an expansion or refinement of present efforts.

The latter three respondents have components of already planned coherent systems SRS's Training Rehabilitation & Information Center and DNRC favor systems using 3/4 inch formats while Justice Dept. specifies Beta format. The differences which system completion or upgrading would have on operations are the following.

TRIC

Of all respondents surveyed, TRIC has the most long term experience in using a coherent television production mix: portable, plus portable studio, plus editing. TRIC's distribution efforts are the most extensive also. Upgrading to color with editing would result in the following advantages:

a new color portability would enhance and increase production opportunities which could be acted on.

b control track editing would result in a substantial decrease in editing time.

c the new format would allow TRIC to better organize its duplication and distribution efforts.

d overall time saved with new technology would allow for more programs produced with the same number of personnel within the same time frames.

DNRC

The completion of DNRC's holdings would allow it to produce Public Service Announcements, essays on DNRC projects which could be shown at fairs and public meetings, critical information regarding environmental impact statements, speaker documentation and an occasional television documentary.

DNRC's experience in television seems to be occasioning the development of an approach or policy toward television production with the following observed emphases:

a because much of the information about DNRC's programs is technical, there is a disposition to develop an in-house ability to script television productions.

b a finished television production is not viewed as a single purpose product; television production, whenever possible would be planned for multiple purpose.

c except for the rare TV documentary, video production is being viewed as a vehicle for educating many small special interest audiences.

d while television production will find a place within the Department's information giving process, publications and other communications formats will still share priorities.

d the Department is aware that its use of television technology will not be so intensive that access to its present holdings by other agencies would be foreclosed.

The predictable availability of a portable system would allow the agency to develop in-house capability without extensive recourse to expensive private production companies.

Highway Patrol

Personnel within the Highway patrol are well aware of the difference new television technology would make if their contemplated system comes into being. The Patrol views developing video software and bicycling materials to their regional training centers as a superior way to take advantage of expertise located in or passing through Helena. The Highway Patrol sees video as a way to insure that the same information reaches personnel or trainees at the same time.

Television's Cost Benefits

The respondents surveyed were aware that television offers cost savings. The importance which respondents placed on savings depended upon what each was doing with its unique programs.

The Highway Patrol & TRIC maintain extensive field training efforts; quite naturally, travel, personnel time and distribution of training materials are costs which they recognize television can help control. Other respondents do not maintain extensive training efforts and have client groups which do not require a continuous flow of information; with such a client profile, television is seen as an effecient tool for storing and retrieving information for public meetings, workshops, etc.

Personnel for Television Production

Lack of personnel hampers television use more than lack of technology. All the respondents voiced the awareness that

television production requires a variety of skills which personnel hired for non television tasks seldom have to any degree. With the exception of TRIC, other agencies rely on winging it with personnel who learn as they shoot or have been fortunate to have personnel on staff who have related experiences in 16mm or 35mm to get the job done: for example, Highway Patrol is fortunate to have Bob Fears who has experience in television medical education before coming to Justice, as DNRC is fortunate to have information officers experienced in photography and some television. Given tighter budgets, the respondents were not optimistic that personnel problems will be solved.

In its image processing mode, television technology can be located in relatively small spaces; in an indirect way, respondents were asked what their attitudes might be to colocating staffs doing television in one building: the inquiry did not ellicit much of a response.

Television's Priorty Rating Within Agencies

Conversations revealed that when budget cuts have to be made in the annual budgeting process television hardware is one of the first victims. The priority rating given television was universally reported as "low".

Sharing Hardware Acquisition Costs

While the principle of sharing was commonly agreed upon, needs particular to each agency qualified that agreement.

For Fish & Game, field work occurs on a planned and an 'opportunity' basis; it would be difficult to share a field portable system when personnel would require short notice access. Highway Patrol is planning a fairly extensive in-house studio type production effort; many of its programs will be of the 'opportunity' type which would require short notice. TRIC produces on a regular basis with productions planned; TRIC's operational configuration might allow a predictable hardware scheduling from a shared pool; this would hold true for the other respondents whose planned productions are not that extensive.

Scheduling editing is not as critical a 'demand' problem to respondents. It was suggested to respondents that unless an agency could predict 1000 hours of editing time use per year, there was little justification for purchasing an editing system: no respondent reported a 1000 hour per annum need.

HOLDINGS AT MONTANA'S SIX-UNIVERISTY UNITS

The following University System personnel were interviewed either by phone or on site visits:

Montana State University*
Television Center
Jack Hyyppa, Director
Tom Jenking, Engineer
Bozeman, 994-3437

Western Montana College*
Instructional Media
Sally Mortier, Director
Dillon, 683-7011

Montana College of Mineral Sc.*
Media, Publications & Information
Dave Edelman, Director
Butte, 496-4193

Eastern Montana College*
Instructional Development Cntr.
R. S. Jassal, Director
Dennis Sculd, Production Director
Billings, 657-2171

University of Montana
Radio Television Dept.
Gregg McDonald, Television Dir.
Charles Lubrect, Engineer
Missoula, 243-4931

University of Montana
Instructional Materials Services
Robert Wachtel, Production Director
Missoula, 243-4070

Northern Montana College
Instructional Media
Cris Middleman, Director
Havre, 265-7821

On Line Systems:

For reporting purposes, equipment holdings within the University system have been classified as coherent or incoherent production systems. Coherency has been defined as the ability to tape, edit, and duplicate video programs on the same format machines in either B & W or in color. Acquisition patterns are termed coherent if they evidence attention to such factors as compatability of formats, potential for aggregating to more sophisticated systems

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* On site visits made

or staggered use, awareness of state-of-the-art and obselesence patterns in industry effecting compatability of the formats with standard accessories or auxiliary production tools--character generators, patching systems, distribution, etc.

With the exception of Western Montana College, all units of the University System can produce videotape coherently in Black & White. B & W holdings are old, but still used for videotaping lectures, group therapy, etc. As mentioned in describing the uses to which Dept. of Instutions puts television, respondents report that there is a place for B & W television where color would not add appreciably to the product.

Coherent color production occurs at three units: the two Universities and Northern Montana College. The three units reporting color coherency all produce and edit in 3/4 inch format; MSU's TV Center also produces coherently in 1 inch Ampex C format. Eastern Montana College and Montana Tech have color production capability on various formats, while Western has a modest record & playback B & W capability.

Only the two University units reported sophisticated hardware; both units now have studio and field-portable 3 tube cameras with 10x1 lenses, control track editing--SMPTE time code for the U of M--and time base correction with title generation, multiplexers, etc. After many years of operating museums, both Universities can now claim full broadcast configuration state-of-the-art systems.

Coherence of acquisition patterns are evidenced at the two Universities, Northern, Western and Montana Tech. While Western Montana College has a simple system it was purchased with coherence in mind. Northern's system is 3/4 inch mainline, with some B & W occasionaly used; Northern will continue in the 3/4 inch format with expectations of upgrading with newer versions of present holdings. Montana Tech has delayed purchase of new systems until declining costs of quality television hardware allowed the purchase of a integrated system: for Montana Tech that crossover point seems to have been reached and discussions are underway concerning system upgrade. Western, at Dillon, has been the stepchild of the University System for several bienniums, with a renewed mandate, plans to install an integrated television system are being discussed.

Patterns of Use

Traditionally, within higher education, television has been assigned a dual mandate: 1) to serve as a tool to instruct students in the use of television technology and 2) to act as an instructional tool for academic departments. While doing both, television in tax supported institutions is also expected to be available for public service in one form or another. Units within the University System have addressed these issues in individual ways.

1) The University of Montana divides television effort into the academic department of Radio Television and a production component in Instructional Materials Service. Territories have been well enough established at the University that both elements perform their roles harmoniously. Both units have their primary purpose as support of academic functions, both units have supported grant projects which are considered extra-academic and have made services and hardware available for non academic public service projects.

2) The Television Center at Montana State Univeristy is the major service deliverer for television at the unit: some hardware is located in Secondary Education, but is primarily of a record/playback nature without coherence. Recently the TV Center was defined as an independent support element within the University with a mandate to serve the academic needs of the Radio Television Program and the Instructional needs of the departments.

3) Northern Montana College at Havre is primarily a service deliverer within the audio-visual support component. Considerable television use is reported for documentation, use by Education, English, P.E. and Art Departments. Personnel is not always adequate for needs; over time some instructors have learned to be their own producers. More use would be possible if funds were available to allow faculty release time to develop educational software.

4) Montana Tech is presently developing an integrated approach to use television as an interactive tool for instruction. A studio class room is being planned for a two camera production capability. As a technical school, television is viewed as a means of giving perspective and enrichment to course material which is highly abstract.

5) Patterns of use at Western are determined by the lack of a sophisticated format. An adequate studio space is available for documenting lectures and other information, the equipment is portable and moves from building to building. The A-V component does not have a 3/4 inch color machine, when needed, it borrows a machine from the local hospital.

6) Eastern Montana College is the only unit surveyed which evidences an extreme balkanization of holdings: non coherence in instructional effort and in equipment acquisition. While the designated instructional support component at Eastern, the Instructional Development Center, has a coherent B&W production capability--with 3/4 and 1/2 inch record/playback and while it supports the instructional efforts of departments which have no video holdings, it is only one of a number of the incoherent delivery systems on campus: in the last few years, departments have been acquiring their own holdings which represent better technology than that held by the Center.

The complex housing the A-V component has the best lecture hall observed: two 35mm back screens behind the podium, mic and slide switching from the podium with excellent acoustics. To date, the Development Center has not had resources to adapt the hall for video. The Center recently suffered from a space reduction which has eliminated its studio production area; having won approval for a large screen projection system, it has no place to house it.

While the Instructional Development Center evidences the ability to deliver coherent services, balkanized holdings and departmental independence make the television effort at Eastern the most incoherent, most duplicative and most wasteful observed, whether it be within the University System or Departments of State.

Non Academic & Public Service Use

All units of the University System respond to community requests and on-campus requests which do not strictly fall within supporting a degree program or other instruction, With the exception of the two Universities, requests at other units are too infrequent to report a pattern.

Television holdings at both universities developed from the degree giving programs each offer in Broadcast; from that original foundation, both have developed similar approaches to offering services, but with a different emphasis.

The TV Center at Bozeman now functions as an independent production unit; it is subsidized for its support given to the Film/TV degree program, and other clearly agreed upon services, but must cover any shortfalls from services given non specified campus and off-campus users. As such, the unit has a modified mandate to achieve self-sufficiency.

Since defined subsidies are not sufficient to cover all expenses, the TV Center actively seeks projects and is in the process of developing services for state agencies and public service organizations: for example, the Center offers state agencies a quality Public Service Announcement at $150.00 per PSA. The Center has a published rate card used for non academic & grant projects. Like the University of Montana, the TV Center will not engage in productions which compete with private houses. At a casual glance, the rate card might appear too rigid; however, the Center does negotiate, and is sensitive to its obligations as a tax supported entity to provide services to the tax paying community.

There is no way to escape the fact that television production costs money; however, a potential user of a facility like the TV center should keep the following in mind.

1. The more planning, before production, which the client can do in-house will save money and allow the producer to concentrate on television: have a well developed script or production idea, have a clear idea of desired special effects, etc.
2. Panic television production results in panic prices; if a walk-in expects to command a facility on short notice, then expect to pay accordingly for the inconveniences caused the producer. A thirty day notice for the Bozeman facility is appreciated.
3. For projects which involve grant funds 'to be requested', it is wise to involve a production facility before grant submission, rather than requesting a specific sum in expectations that the awarded line item will be sufficient to achieve the expected result.

Support for instructional efforts is concentrated at the Instructional Materials Services at the University of Montana; the Radio/Television Department supports an academic effort. The most coherent television holdings at the University are located in the Radio/TV department.

Where the University IMS is not able to provide instruccional support to a department, Radio/TV assists; television production under grants is generally done by Radio/TV. While the department is subsidized for its academic efforts, a larger percentage of its television revenues derive from non-academic production: grants, etc. Because Radio/TV's mandate is academic, and the bulk of its time is spent on teaching, it differs from Bozeman's TV Center. Radio/TV has no published rate card; when time allows, it is more than willing to discuss giving support to a project on a case by case basis with charges dependent on time available and the ability of the prosepective user to pay. The Department does not compete directly with for-profit production houses; when faced with a project that could be done by a for-profit, it will deliver the service only if it can be done nowhere else.

Like the TV Center in Bozeman, prospective users should note the three observations already made concerning costs and effeciencies if using the Missoula facility. It should be mentioned, that when both facilities release hardware for projects, operators must accompany the equipment: neither facility can be described as a "hands-on" facility.

PART TWO: BROADCAST FACILITIES

All Montana Broadcasters were surveyed either by phone or personal visit: station facilities already known to the investigator were surveyed by phone, unknowns visited. Six of the eleven television stations are owned by two networks: Montana Television Network--KXLF; KTVQ; KRTV; & KPAX; Eagle Communications, KECI; KCFW--the remaining stations are either locally owned or are the only stations representing a corporation's activity in Montana.

Montana Stations & Persons Contacted

Billings:

KTVQ
3203 3rd. Ave. N.
J. R. Middleton: Chief ENG.
252-5611

KULR
Indian Caves Road
Bob Korum: Manager
252-4676

Butte:

KXLF
1003 S. Montana
Bill Leech: Production Dir.
496-4193

Great Falls:

KFBB
N. of Gt. Falls
Ted Schroeder: Production Dir.
453-4377

KRTV
N. of Gt. Falls
Scott Travis: Production Dir.
453-2433

Kalispell:

KCFW
401 1st. Ave. E.
Mike Stocklin: Vice President
755-5239

Hardin:

KOUS
Drawer D
Tom Curtis: Manager
655-3320

Helena:

KTCM
(survey completed by mail)
2433 N. Montana
443-5050

Miles City:

KYUS
David G. Rivenes: Manager
232-3540

Missoula:

KPAX
2204 Regent
Pete Frieden: Manager
543-7106

KECI
340 W. Main
Jack Scholmer: Program Dir.
721-2063

All Montana broadcast stations serve what national rating services call 'small markets': the largest, Billings, is rated by Nielson as 174th among 214. Though Montana's stations serve small markets, FCC rules and Network affiliation standards require that signal quality and service to the local population are of the same level as major markets.

The survey of stations yielded few suprises; every station surveyed can field 2 cameras for studio production; the main line camera technology is state of the art; main line video tape machines show some differences which reflect an individual station's production philosophy.

Three stations rely exclusively on 3/4 inch video machines: KOUS, KYUS & KCFW.--the remaining Montana stations rely on 1 inch or 2 inch technology. Within the Montana Television Network, there is movement toward installing the new 1 inch helical scan technology.

Regardless of main line video machines, all stations can now play back 3/4 inch tapes and time base the same for broadcast purposes.

With few exceptions, broadcasters have installed 3/4 inch editing suites for their news gathering efforts. within the Montana Television Network, film still plays a significant role.

Montana television stations did not report that they considered themselves as production houses: stations seldom act as contracted producers. As small market stations, Montana's broadcasters report that their local public affairs programs and production for advertisers effectively ties up most of their production capacity. Montana stations report that they will produce special programs if the same have some utility for their service area; where such is not the case they would prefer that a potential program be produced by a independent production house.

Montana broadcast, historicaly, began on shoe string financing; perhaps that era is coming to a close. While small, Montana's Broadcaster have on line coherent state of the art technology, in cameras, switching and tape machines.

PART THREE: INDEPENDENT PRODUCERS

Eight independent production facilities were sampled to assess the overall state of independent production art. Three of those interviewed began as film production houses, the remaining began with television technology.

Independent's Surveyed

Bozeman:

Western Am. Film Co.
Box 217
Ken Slater
587-2520

Ron Bayley Film & Tapes
202 S. Lindly Pl.
Nancy Bayly Landgres
586-9656

Great Falls:

Rico Lion
1001 3rd. Ave. NW
Jim Colla

North Country Media Group
Box 2244
Voanne Attwood & D. Bliler

Helena:

Video Express
5530 Georgia Dr.
Gary Tyree
458-9864

WarWood Productions
1028 Helena
Dennin Woodhouse
442-6580

Missoula:

MQ/TV
210 N. Higgins
Mary Canty
543-6333

Mont. Inst. High. Tech. Appl.
210 N. Higgins
M. Wisocki
721-1156

Though the surveyed organizations represent a profile of independent production, by no means, is the list inclusive.

In general production houses hold inexpensive 3 tube cameras: KY 2000's and Sharp XL 700's or Sony single tube 1640's, 1610's or Hitach GP series. All respondents produce in 3/4 inch format, though editing is performed either on 3/4 inch, 1 inch or Quad.

Three organizations report holding 3/4 inch editing systems: Rico Lion; Western Am. Film Company; Montana Inst. One independent, North Country reports 1 inch C format editing and high end 3 tube Hitachi SK series camera.

Independents support their efforts in a variety of ways: the three film companies who transferred their activities to video are using television technology to service clients who originally used film--the Bozeman film operations produce documentaries, commercial ads, and produce instructional training films. Rico Lion, in Gt. Falls, is the only respondent to report

a major self-financed effort to produce its own properties for distribution to the educational/industrial market. The remaining companies report relying on contracts to make expenses. Of the respondents surveyed, the former film companies are the longest lived and report a larger percentage of revenue is derived from out of state contracts; this differs from companies which began with video; they are younger and rely on local revenues.

One duplication house, North Country, reports a state of the art multiple format facility. North Country edits on C format helical, can dub to quad, all U-Matics and 1 inch. North Country has a well developed Electronic Field Production van; like the film companies, North Country's revenues, in the main, come from out of state activities.

CONCLUSION

The intent of the survey was description and identification; from such a survey, few conclusions can be drawn.

From the data, state holdings are obselete, yet, used to the maximum. If present holdings were upgraded and expanded, costs incurred would run to six figures. Any upgrading will bring with it the potential for a confusion of formats and equipment incompatability.

The activities of Montana's broadcasters and independent production houses are a reflection of Montana's sparse population and Montana's minimal use of television technology for education, training, etc. It is doubtful that Montana will grow sufficiently to create major markets for television stations, or create a a healthy economic base for private producers to rely on local revenues.

Of the three general areas surveyed, the area most likely to expand and evolve a more sophisticated television effort is in Departments of State.

ATTACHMENT E

PART IV

APPENDIX 1-A: SURVEY DOCUMENT: AGENCIES & DEPARTMENTS OF STATE

TELEVISION MONITORS (AND OR) RECEIVERS

Brand Name	Age	Number of Units	B&W	Color	Screen Size (Inches)	Monitor	Receiver	Both
			☐	☐		☐	☐	☐
			☐	☐		☐	☐	☐
			☐	☐		☐	☐	☐
			☐	☐		☐	☐	☐
			☐	☐		☐	☐	☐
			☐	☐		☐	☐	☐

1.) Have you set aside a permanent space for viewing videotapes? Yes ☐ No ☐

2.) If no, do you have a cart to move your equipment from room to room?

3.) How often do you have your monitors/receivers adjusted or maintained?

(6 mos. _____) (1 yr. _____) (2 yrs. _____) (no record of the last time it was done _____)

When equipment fails _____)

4.) How often do you use your monitors?

_____ Weekly _____ Monthly _____ Quarterly _____ Other

5.) What monitors/receivers do you require to meet future needs? _____

_____

_____

VIDEO TAPE MACHINES

Brand & Model	Quantity	Age	Color		Format (tape size)			Audio Dub feature		Video	Edit	Field Portable	Console
			Yes	No	1"	¾"	½"	Yes	No	Yes	No		
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

_____ Weekly _____ Monthly _____ Quarterly _____ Other

What type(s) of videotape machine(s) do you require to carry on future television activities?

_____

_____

_____

1-A-2

TELEVISION CAMERAS

Brand & Model	Quantity	Age	Color		# of Tubes			Field Portable	Studio Type	Lens		
			Yes	No	1	2	3			4×1	6×1	10×1
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

How often do you use your cameras?

_____ Weekly _____ Monthly _____ Quarterly _____ Other

What type(s) of camera(s) do you require to carry on future television activities?

_____

_____

_____

TRIPOD HEADS FOR VIDEO AND 16/35mm

Brand & Model	Fluid Head	Cam Head	Friction Head	Cradle Head	Tilt Head	Ball Head	Twin Head	Carrying Capacity lbs.
	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	
	☐	☐	☐	☐	☐	☐	☐	

1-A-3

TRIPODS FOR VIDEO OR 16/35mm

Brand	Quantity	Mono pod	Pedestal		Hydraulic		Telescoping		Claw ball w/Dollies		w/Column Crank	
			Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
_____	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	Yes	No
1.) For what purposes do you use your television equipment?		
1.) In house training	☐	☐
2.) Documenting speakers, etc.	☐	☐
3.) Making Public Service Announcements for Broadcast Television	☐	☐
4.) Making documentaries for Television	☐	☐
5.) Television presentations for public meetings	☐	☐
2.) Do you share your video holdings with other departments?	☐	☐

3.) How often do you receive requests for the loan of your equipment?

_____ Weekly? _____ Monthly? _____ Quarterly? _____ Other?

4.) What conditions do you place on the loan of your equipment—please list.

_____

_____

_____

_____

_____

_____

_____

_____

5.) For future purchases would you be willing to acquire hardware jointly with another agency and share the item? Yes ☐ No ☐

6.) What special conditions would you set for joint purchase and ownership?

_____

_____

_____

_____

_____

_____

_____

_____

7.) Do you have staff assigned to produce videotapes for the agency? Yes ☐ No ☐

(If yes, how many F.T.E.? _____)

LIGHTS

HOW USED (Please Check)

Brand	Quantity	Fresnel Lens	Barn Doors	Watts	Spot/Flood	Key/Back	Softlight	Base/Fill	Effects
_____	_____	☐	☐	_____	☐	☐	☐	☐	☐
_____	_____	☐	☐	_____	☐	☐	☐	☐	☐
_____	_____	☐	☐	_____	☐	☐	☐	☐	☐
_____	_____	☐	☐	_____	☐	☐	☐	☐	☐
_____	_____	☐	☐	_____	☐	☐	☐	☐	☐

LIGHTING ACCESSORIES

1.) Do you use:

	Yes	No
Specialized Lighting Mounts	☐	☐
Scrims	☐	☐
Gels	☐	☐
Snoots	☐	☐
Light Reflectors	☐	☐
Umbrellas	☐	☐

	Yes	No
2.) Do you have distribution equipment such as plugging strips wall boxes, portable plugging boxes, etc.?	☐	☐
3.) Do you have fixtures such as dimmer banks, cold patches, control consoles, etc.?	☐	☐

MICROPHONES

Brand	Quantity	Bi Directional	Omni Directional	Cardiod	Shotgun	Dynamic or Condenser	
_____	_____	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐
_____	_____	☐	☐	☐	☐	☐	☐

Do you have microphone mixing ability? Yes ☐ No ☐

(If yes, please list type.) _____

1-A-6

	Yes	No
1.) Does your agency use 35mm slide shows?	☐	☐
1.) Staff training ☐		
2.) Public Meetings ☐		
3.) Television Public Service Announcements ☐		
2.) Do you have staff to produce 35mm presentations?	☐	☐
3.) Do you contract 35mm work?	☐	☐
If yes, how often? _____		
If yes, for what type of project? _____		
4.) Do you produce 16mm films?	☐	☐
If yes, how often? _____		
If yes, for what type of movie? _____		
5.) Do you have a film maker on staff?	☐	☐
6.) Do you contract out 16mm work?	☐	☐
If yes, how often? _____		
If yes, for what types of projects? _____		

Please List 35mm Equipment Owned

Camera Head Types

_____

_____

_____

Lenses

_____

_____

_____

Flash and Other Attachments

_____

_____

_____

	Yes	No
Do you own your own 16mm camera?	☐	☐

If yes, please list camera _____

_____

lenses _____

_____

SoundSync tape recorder _____

Additional magazines _____

ATTACHMENT E

PART V

APPENDIX 1-B:

page: 1-B-1 Agency Names & Codes
1-B-3 Major Equipment Holdings
1-B-11 Use Patterns
1-B-19 Needs
1-B-25 Equipment Sharing
1-B-27 35 & 16mm Film

TELEVISION HOLDINGS AND ACCESSORIES

AGENCY NAMES AND CODES

1-V.....STATE BOARD OF EDUCATION
Museum Program

2-V.....FISH AND GAME
Film Center

3-V.....HEALTH AND ENV. SCIENCES
3-Va.....Film Library
3-Vb.....Solid Waste Mngt. Bureau

4-V.....DEPARTMENT OF HIGHWAYS
4-Va.....Personnel Division
4-Vb.....Preconstruction

5-V.....DEPARTMENT OF INSTITUTIONS
5-Va.....Alcohol and Drug Abuse Division
5-Vb.....Warm Springs
5-Vc.....Boulder
5-Vd.....Eastmont Training Center-Glendive
5-Ve.....Galen
5-Vf.....Corrections

6-V.....DEPARTMENT OF JUSTICE
6-Va.....Highway Patrol
6-Vb.....Law Enforcement Academy

7-V.....LABOR AND INDUSTRY
7-Va.....Employment Security Division
7-Vb.....Worker's Compensation Division
7-Vc.....Centralized Services for Employment Training and Compliance

8-V.....NATURAL RESOURCES AND CONSERVATION
8-Va.....Renewable Energy Bureau
8-Vb.....Land Use Planning division

9-V.....SOCIAL AND REHABILITATION SERVICES

10-V.....OFFICE OF PUBLIC INSTRUCTION
Library Media Component

35-1.....ADMINISTRATION
Communications Division

35-2.....DEPARTMENT OF AGRICULTURE
Directors Office

35-3.....OFFICE OF THE GOVERNOR

35-4.....DEPARTMENT OF LANDS
Commissioner's Office

AGENCY NAMES AND CODES CONTINUED

35-5.....DEPARTMENT OF HIGHWAYS
35-5a.....Photo Unit
35-5b.....Travel Promotions

35-6.....DEPARTMENT OF JUSTICE
35-6a.....Fire Marshal
35-6b.....Criminal Investigation Bureau
35-6c.....Board of Crime Control

TELEVISION MONITORS AND OR RECEIVERS

AGENCY CODE	BRAND AND MODEL	QUANTITY	BLACK & WHITE	COLOR	MONITOR	RECEIVER
1-V	-	-	-	-	-	-
2-V	SONY	2	-	X	X	X
3-Va	SONY 1978 & CVM 1973	2	X	X	X	-
3-Vb	SONY & HITACHI	2	-	X	X	X
4-Va	RCA Lyceum & PANASONIC CT 1910	2	-	X	X	-
4-Vb	BLANK	1	X	-	X	-
5-Va	SONY	2	X	-	X	X
5-Vb	SONY & BETAMAX	2	X	-	X	X
5-Vc	SONY	1	X	-	X	X
5-Vd	SONY & MAGNAVOX	2	X	-	X	X
5-Ve	Sony	1	-	X	X	-
5-Vf	3 SONY & 1 HITACHI	4	X	X	X	X
6-Va	SONY	1	X	-	X	X
6-Vb	SONY & PANASONIC	2	X	X	X	X
7-Va	5 SONY & 1 HITACHI	6	X	X	X	X
7-Vb	CONCORD MR700 & TOSHIBA V5	2	-	X	X	-
7-Vc	PANASONIC	1	-	X	X	-
8-Va	PANASONIC CT-911VA & CT-1310	2	-	X	X	-
8-Vb	RCA	1	X	-	-	X
9-V	SONY	4	X	-	X	X
10-V	2 SONY & 1 HITACHI	3	X	X	X	X

VIDEOTAPE MACHINES

AGENCY CODE	BRAND AND MODEL	QUANTITY	COLOR	FORMAT
1-V	SONY VP 1200	1	X	3/4"
2-V	SONY U-MATIC	2	X	3/4"
3-Va	SONY VO 2600 & SONY AV3600	2	X	3/4"
3-Vb	SONY VO 1800, SONY VP1000 PANASONIC NU 8400	3	X	2-3/4" 1-1/2"
4-Va	PANASONIC	1	BLANK	3/4"
4-Vb	SONY & PANASONIC	2	BLANK	1/2"
5-Va	SONY AV 3400 & SONY	2	BLANK	1/2" & 3/4"
5Vb	SONY & BETAMAX	2	BLANK	BLANK
5-Vc	SONY AV 3650 & Sony	2	BLANK	1/2"
5-Vd	SONY	1	BLANK	1/2"
5-Ve	2 SONY	2	BLANK	1" & 1/2"
5-Vf	1 SONY AV 8400 & 1 SONY AV 3400 2 SONY SLP 100	4	(SLP)X	1/2"
6-Va	SONY	1	BLANK	1/2"
6-Vb	2 SONY VP 1200 & 5 SONY VP 1000	7	x	3/4"
7-Va	3 SONY, 1 JVC, & 1 PANASONIC	5	x	2-1/2" 1-3/4"
7-Vb	CONCORD VTR 800	1	X	3/4"
7-Vc	PANASONIC	1	X	3/4"
8-Va	PANASONIC 9000 6-2	1	x	3/4"

VIDEOTAPE MACHINES CONTINUED

AGENCY CODE	BRAND AND MODEL	QUANTITY	COLOR	FORMAT
8-Vb	VCR CR-6060 U	1	X	1-3/4"
9-V	2 SONY 3650, 2 SONY 3600 1 SONY VP 2000	5	X	2-1/2" 1-3/4"
10-V	SONY	4	X	1-3/4" 3-1/2"

TELEVISION CAMERAS

AGENCY CODE	BRAND AND MODEL	QUANTITY	COLOR	LENS
1-V	NONE	-	-	-
2-V	None	-	-	-
3-Va	SONY AVC 3200	1	BLANK	BLANK
3-Vb	PANASONIC WV 3320	1	x	6X1
4-Va	NONE	-	-	-
4-Vb	SONY	1	X	BLANK
5-Va	SONY 3400 & SONY AVC 3260	2	BLANK	4X1
5-Vb	SONY & BETAMAX	2	BLANK	BLANK
5-Vc	2 SONY	2	BLANK	2X1 4X1
5-Vd	SONY	1	X	ZOOM
5-Ve	NONE	-	-	-
5-Vf	SONY AVC 3450	1	BLANK	4X1
6-Va	SONY	1	BLANK	4X1
6-Vb	NONE	-	-	-
7-Va	9 SONY, 2 JVC & 8 PANASONIC	19	X	4x1 6X1
7-Vb	CONCORD MTC 18 & CONCORD TCM 20	2	X	4X1 10X1
7-Vc	NONE	-	-	-

TELEVISION CAMERAS

AGENCY CODE	BRAND AND MODEL	QUANTITY	COLOR	LENS
8-Va	NONE	-	-	-
8-Vb	RCA TC 1005 & RCA INFARED	2	BLANK	6X1
9-V	SONY AVC 3200	4	BLANK	ZOOM
10-V	SONY AVC 3450 & SONY AVC 3400	2	BLANK	BLANK

TRIPODS FOR VIDEO AND 16/35mm

AGENCY CODE	BRAND AND MODEL	QUANTITY	HEAD TYPE
1-V	VIVITAR & DAVUDSON	2	BLANK
2-V	MILLER JR.,O'CONNOR & AURILON	3	2 FLUID 1 FRICTION
3-Va	NONE	-	-
3-Vb	CHALLENGER	1	BLANK
4-Va	NONE	-	-
4-Vb	SONY	1	FRICTION
5-Va	SONY VCT 20A	1	Friction
5-Vb	NONE	-	-
5-Vc	BLANK	1	TILT HEAD
5-Vd	SONY	1	BALL HEAD
5-Ve	NONE	-	-
5-Vf	NONE	-	-
6-Va	NONE	-	-
6-Vb	BLANK	1	BLANK
7-Va	SONY, HUSKY, DAVIS STANDARD	3	BLANK
7-Vb	NONE	-	-
7-Vc	NONE	-	-
8-Va	NONE	-	-
8-Vb	NONE	-	-
9-V	SAMPSON QUICK SET 7481 HUSKY QUICK SET	3	CRADLE HEAD TILT HEAD
10-V	NONE	-	-

MICROPHONES

AGENCY CODE	BRAND AND MODEL	QUANTITY	TYPE
1-V	NONE	-	-
2-V	SENNHEISER 815, SHURE SM 7 ELECTROVOICE RE41	3	SHOTGUN CARDIOD
3-Va	NONE	-	-
3-Vb	SONY, LAFAYETTE & SONY	3	1 OMNI DIR. 2 CARDIOD
4-Va	NONE	-	-
4-Vb	NONE	-	-
5-A	SPHER-O-DYNE, UNIDYNE &NORELCO	3	2 OMNI DIR. 1 BI DIR.
5-Vb	SONY & BETAMAX	2	OMNI DIR.
5-Vc	SONY	3	ONMI DIR.
5-Vd	SONY	1	OMNI DIR.
5-Ve	NONE	-	-
5-Vf	NONE	-	-
6-Va	NONE	-	-
6-Vb	NONE	-	-
7-Va	SONY	15	BI DIR, OMNI DIR CARDIOD
7-Vb	NONE	-	-
7-VC	NONE	-	-
8-Va	NONE	-	-
8-Vb	NONE	-	-
9-V	TOA DM 902 & SONY ECM 16	5	OMNI DIR.
10-V	NONE	-	-

LIGHTS

AGENCY CODE	BRAND AND MODEL	QUNATITY	ACCESSORIES
1-V	NONE	-	-
2-V	LOWEC COLOR TRAIN & NUMEROUS STUDIO LIGHTS	6	X
3-Va	NONE	-	-
3-Vb	NONE	-	-
4-Va	NONE	-	-
4-Vb	NONE	-	-
5-Va	NONE	-	-
5-Vb	NONE	-	-
5-Vc	NONE	-	-
5-Vd	NONE	-	-
5-Ve	NONE	-	-
5-Vf	NONE	-	-
6-Va	NONE	-	-
6-Vb	NONE	-	-
7-Va	SMITH VICTOR	1 SET OF 3	-
7-Vb	NONE	-	-
7-Vc	NONE	-	-
8-VA	NONE	-	-
8-VB	NONE	-	-
9-V	ACME LITE	3	-
10-V	NONE	-	-

QUESTION: FOR WHAT PURPOSES DO YOU USE YOUR TELEVISION EQUIPTMENT?
1-IN HOUSE TRAINING?
2-DOCUMENTING SPEAKERS, ETC.
3-MAKING PSA's FOR BROADCAST?
4-MAKING DOCUMENTARIES FOR BROADCAST?
5-TELEVISION PRESENTATIONS AT PUBLIC MEETINGS?

1-B-11

AGENCY NAME	ANSWER
STATE BOARD OF EDUCATION	
Museum Program	NO USAGE, BUT WOULD FOR PUBLIC MEETINGS
FISH AND GAME	
Film Center	1,4,5
HEALTH AND ENV. SCIENCES	
Film Library	1,2,5
Solid Waste Mngt. Bureau	1,2,5
DEPT. OF HIGHWAYS	
Personnel Division	NO ANSWER
Preconstruction	1,2,5
DEPT. OF INSTITUTIONS	
Alcohol and Drug Abuse Div.	1,2
Warm Springs	1,2,5
Boulder River School	1,5
Eastman Training Center-Glendive	1,2
Galen	NO ANSWER
Corrections	1,2
DEPT. OF JUSTICE	
Highway Patrol	1,5
Law Enforcement Academy	1,2,4,5
LABOR AND INDUSTRY	
Employment Security Div.	1,2,5
Worker's Compensation Div.	1,2,5
Centralized Services/Training & Compliance	1
NATURAL RESOURCES AND CONSERVATION	
Renewable Energy Bureau	1,3,4
Land Use Planning Div.	5
SOCIAL AND REHABILITATION SERVICES	
T.R.I.C.	1,2,5
OFFICE OF PUBLIC INSTRUCTION	
Library Media Component	2

AGENCY NAME	QUESTION	HOW OFTEN DO YOU USE YOUR MONITORS?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO MONITORS
FISH AND GAME			
Film Center			WEEKLY
HEALTH AND ENV. SCIENCES			
Film Library			WEEKLY
Solid Waste Mngt. Bureau			MONTHLY
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			NO PATTERN
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			MONTHLY
Warm Springs			WEEKLY
Boulder River School			WEEKLY
Eastman Training Center-Glendive			QUARTERLY
Galen			DAILY
Corrections			MONTHLY
DEPT. OF JUSTICE			
Highway Patrol			SEMI-ANNUALLY
Law Enforcement Academy			WEEKLY
LABOR AND INDUSTRY			
Employment Security Div.			WEEKLY
Worker's Compensation Div.			MONTHLY
Centralized Services/Training & Compliance			OTHER
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			MONTHLY
Land Use Planning Div.			MONTHLY
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			WEEKLY
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			OTHER

AGENCY NAME	QUESTION: HOW OFTEN DO YOU USE YOUR VIDEOTAPE MACHINES?	ANSWER
STATE BOARD OF EDUCATION		
Museum Program		NO ANSWER
FISH AND GAME		
Film Center		WEEKLY
HEALTH AND ENV. SCIENCES		
Film Library		WEEKLY
Solid Waste Mngt. Bureau		WEEKLY
DEPT. OF HIGHWAYS		
Personnel Division		NO ANSWER
Preconstruction		OTHER
DEPT. OF INSTITUTIONS		
Alcohol and Drug Abuse Div.		MONTHLY
Warm Springs		NO ANSWER
Boulder River School		WEEKLY
Eastman Training Center-Glendive		QUARTERLY
Galen		DAILY
Corrections		MONTHLY
DEPT. OF JUSTICE		
Highway Patrol		MONTHLY
Law Enforcement Academy		WEEKLY
LABOR AND INDUSTRY		
Employment Security Div.		WEEKLY
Worker's Compensation Div.		OTHER
Centralized Services/Training & Compliance		OTHER
NATURAL RESOURCES AND CONSERVATION		
Renewable Energy Bureau		MONTHLY
Land Use Planning Div.		MONTHLY
SOCIAL AND REHABILITATION SERVICES		
T.R.I.C.		WEEKLY
OFFICE OF PUBLIC INSTRUCTION		
Library Media Component		WEEKLY

AGENCY NAME	QUESTION	HOW OFTEN DO YOU USE YOUR CAMERAS?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO ANSWER
FISH AND GAME			
Film Center			NOT APPLICABLE
HEALTH AND ENV. SCIENCES			
Film Library			OTHER
Solid Waste Mngt. Bureau			WEEKLY
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			OTHER
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			MONTHLY
Warm Springs			NO ANSWER
Boulder River School			WEEKLY
Eastman Training Center-Glendive			QUARTERLY
Galen			NOT APPLICABLE
Corrections			MONTHLY
DEPT. OF JUSTICE			
Highway Patrol			NOT APPLICABLE
Law Enforcement Academy			NOT APPLICABLE
LABOR AND INDUSTRY			
Employment Security Div.			WEEKLY
Worker's Compensation Div.			OTHER
Centralized Services/Training & Compliance			NOT APPLICABLE
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			MONTHLY
Land Use Planning Div.			NOT APPLICABLE
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			MONTHLY
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			OTHER

AGENCY NAME	QUESTION	DO YOU HAVE STAFF ASSIGNED TO PRODUCE VIDEO FOR THE AGENCY?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO
FISH AND GAME			
Film Center			NO
HEALTH AND ENV. SCIENCES			
Film Library			NO
Solid Waste Mngt. Bureau			NO
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			NO
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			NO
Warm Springs			NO
Boulder River School			NO
Eastman Training Center-Glendive			NO
Galen			NO ANSWER
Corrections			NO
DEPT. OF JUSTICE			
Highway Patrol			NO
Law Enforcement Academy			NO
LABOR AND INDUSTRY			
Employment Security Div.			NO
Worker's Compensation Div.			NO
Centralized Services/Training & Compliance			NO
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			NO
Land Use Planning Div.			NO
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			YES, THREE FTE
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			NO

AGENCY NAME	QUESTION HAVE YOU SET ASIDE A PERMANENT SPACE FOR VIEWING VIDEOTAPES?	ANSWER
STATE BOARD OF EDUCATION		
Museum Program		NO ANSWER
FISH AND GAME		
Film Center		YES
HEALTH AND ENV. SCIENCES		
Film Library		NO ANSWER
Solid Waste Mngt. Bureau		NO
DEPT. OF HIGHWAYS		
Personnel Division		NO
Preconstruction		NO
DEPT. OF INSTITUTIONS		
Alcohol and Drug Abuse Div.		NO
Warm Springs		YES
Boulder River School		NO
Eastman Training Center-Glendive		NO
Galen		YES
Corrections		NO
DEPT. OF JUSTICE		
Highway Patrol		NO
Law Enforcement Academy		YES
LABOR AND INDUSTRY		
Employment Security Div.		NO
Worker's Compensation Div.		YES
Centralized Services/Training & Compliance		NO
NATURAL RESOURCES AND CONSERVATION		
Renewable Energy Bureau		NO
Land Use Planning Div.		YES
SOCIAL AND REHABILITATION SERVICES		
T.R.I.C.		YES
OFFICE OF PUBLIC INSTRUCTION		
Library Media Component		YES

AGENCY NAME	QUESTION	IF NO, DO HAVE A CART TO MOVE YOUR EQUIPTMENT FROM ROOM TO ROOM?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO ANSWER
FISH AND GAME			
Film Center			NOT APPLICABLE
HEALTH AND ENV. SCIENCES			
Film Library			YES
Solid Waste Mngt. Bureau			YES
DEPT. OF HIGHWAYS			
Personnel Division			YES
Preconstruction			NO
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			NO
Warm Springs			NOT APPLICABLE
Boulder River School			YES
Eastman Training Center-Glendive			YES
Galen			NO ANSWER
Corrections			NO
DEPT. OF JUSTICE			
Highway Patrol			YES
Law Enforcement Academy			NOT APPLICABLE
LABOR AND INDUSTRY			
Employment Security Div.			YES
Worker's Compensation Div.			NOT APPLICABLE
Centralized Services/Training & Compliance			YES
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			YES
Land Use Planning Div.			NOT APPLICABLE
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			NOT APPLICABLE
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			YES

AGENCY NAME	QUESTION	ANSWER
	HOW OFTEN DO YOU HAVE YOUR MONITORS/RECEIVERS ADJUSTED OR MAINTAINED?	
STATE BOARD OF EDUCATION		
Museum Program		NO ANSWER
FISH AND GAME		
Film Center		NO RECORD
HEALTH AND ENV. SCIENCES		
Film Library		ANNUALLY
Solid Waste Mngt. Bureau		WHEN IT FAILS, 2 YEARS
DEPT. OF HIGHWAYS		
Personnel Division		NO ANSWER
Preconstruction		NO RECORD
DEPT. OF INSTITUTIONS		
Alcohol and Drug Abuse Div.		WHEN IT FAILS
Warm Springs		WHEN IT FAILS
Boulder River School		WHEN IT FAILS
Eastman Training Center-Glendive		WHEN IT FAILS
Galen		WHEN IT FAILS
Corrections		WHEN IT FAILS
DEPT. OF JUSTICE		
Highway Patrol		NO RECORD
Law Enforcement Academy		ANNUALLY
LABOR AND INDUSTRY		
Employment Security Div.		WHEN IT FAILS
Worker's Compensation Div.		WHEN IT FAILS
Centralized Services/Training & Compliance		WHEN IT FAILS
NATURAL RESOURCES AND CONSERVATION		
Renewable Energy Bureau		WHEN IT FAILS
Land Use Planning Div.		WHEN IT FAILS
SOCIAL AND REHABILITATION SERVICES		
T.R.I.C.		1 YEAR
OFFICE OF PUBLIC INSTRUCTION		
Library Media Component		NO RECORD

AGENCY NAME	QUESTION	WHAT TYPE(S) OF VIDEOTAPE MACHINE(S) DO YOU REQUIRE TO CARRY ON FUTURE TELEVISION ACTIVITIES?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO ANSWER
FISH AND GAME			
Film Center			UNKNOWN
HEALTH AND ENV. SCIENCES			
Film Library			WOULD FIND OTHER DEPTS. UNITS O.K.
Solid Waste Mngt. Bureau			"NONE"
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			SATISFIED WITH PRESENT SYSTEM
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			NO ANSWER
Warm Springs			NO ANSWER
Boulder River School			"NONE"
Eastman Training Center-Glendive			NO ANSWER
Galen			NO ANSWER
Corrections			NO BUDGET FOR UPGRADING
DEPT. OF JUSTICE			
Highway Patrol			BETA 1/2 INCH FORMAT
Law Enforcement Academy			REPLACEMENTS- 3/4 INCH
LABOR AND INDUSTRY			
Employment Security Div.			6 1/2 CASSETTES & 1 FIELD PORTABLE
Worker's Compensation Div.			UNDETERMINED
Centralized Services/Training & Compliance			NO ANSWER
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			FIELD PORTABLE 3/4 INCH
Land Use Planning Div.			PORTABLE 1/2 INCH VCR
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			3/4 INCH EDITING WITH SPECIAL EFFECTS
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			NO ANSWER

AGENCY NAME	QUESTION	WHAT TYPE(S) OF MONITORS/RECEIVERS DO YOU REQUIRE TO MEET FUTURE NEEDS?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO ANSWER
FISH AND GAME			
Film Center			NOT KNOWN AT PRESENT
HEALTH AND ENV. SCIENCES			
Film Library			NO ANSWER
Solid Waste Mngt. Bureau			"NONE"
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			NO ANSWER
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			"NOT SURE AT PRESENT"
Warm Springs			NO ANSWER
Boulder River School			"NONE"
Eastman Training Center-Glendive			NO ANSWER
Galen			NO ANSWER
Corrections			"NEED THEM ALL"
DEPT. OF JUSTICE			
Highway Patrol			ADDITIONAL
Law Enforcement Academy			ADDITIONAL
LABOR AND INDUSTRY			
Employment Security Div.			1 COLOR PORTABLE AND 6 "19"s TO REPLACE BLACK & white
Worker's Compensation Div.			UNDETERMINED
Centralized Services/Training & Compliance			NO ANSWER
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			"NONE"
Land Use Planning Div.			19 INCH MONITOR/RECEIVER
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			COLOR TO MATCH VIDEO CASSETTES
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			"NONE

AGENCY NAME	QUESTION	WHAT TYPE(S) OF CAMERA(S) DO YOU REQUIRE TO CARRY ON FUTURE TELEVISION ACTIVITIES?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO ANSWER
FISH AND GAME			
Film Center			"UNDETERMINED"
HEALTH AND ENV. SCIENCES			
Film Library			COLOR FOR CONFERENCE TAPING
Solid Waste Mngt. Bureau			"NONE"
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			CAMERA IS ADIQUATE
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			SUFFICIENT
Warm Springs			NO ANSWER
Boulder River School			"NONE"
Eastman Training Center-Glendive			NO ANSWER
Galen			NO ANSWER
Corrections			"NO BUDGET"
DEPT. OF JUSTICE			
Highway Patrol			BETA COMPATIBLE
Law Enforcement Academy			NO ANSWER
LABOR AND INDUSTRY			
Employment Security Div.			6 STUDIO & 1 FIELD
Worker's Compensation Div.			"UNDERTERMINED"
Centralized Services/Training & Compliance			NO ANSWER
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			FIELD PORTABLE
Land Use Planning Div.			NONE
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			CAMERA TO YOKE TO 3/4 INCH
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			NO ANSWER

AGENCY NAME	QUESTION	DO YOU SHARE YOUR VIDEO HOLDINGS WITH OTHER DEPARTMENTS?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO
FISH AND GAME			
Film Center			YES
HEALTH AND ENV. SCIENCES			
Film Library			TAPES-YES MACHINES-NO
Solid Waste Mngt. Bureau			NO
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			YES
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			YES, OCCASIONALLY
Warm Springs			NO
Boulder River School			NO
Eastman Training Center-Glendive			NO
Galen			NO ANSWER
Corrections			YES
DEPT. OF JUSTICE			
Highway Patrol			NO
Law Enforcement Academy			YES
LABOR AND INDUSTRY			
Employment Security Div.			YES
Worker's Compensation Div.			NO
Centralized Services/Training & Compliance			NO ANSWER
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			NO ANSWER
Land Use Planning Div.			YES
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			YES
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			no answer

AGENCY NAME	QUESTION	HOW OFTEN DO YOU RECEIVE REQUESTS FOR THE LOAN OF YOUR EQUIPTMENT?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			WEEKLY, IN HOUSE
FISH AND GAME			
Film Center			QUARTERLY
HEALTH AND ENV. SCIENCES			
Film Library			MONTHLY
Solid Waste Mngt. Bureau			NO ANSWER
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			INFREQUENTLY, NO PATTERN
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			NO PATTERN
Warm Springs			NEVER
Boulder River School			NEVER
Eastman Training Center-Glendive			NEVER
Galen			NO ANSWER
Corrections			QUARTERLY
DEPT. OF JUSTICE			
Highway Patrol			NEVER
Law Enforcement Academy			WEEKLY
LABOR AND INDUSTRY			
Employment Security Div.			MONTHLY
Worker's Compensation Div.			NO PATTERN
Centralized Services/Training & Compliance			NO PATTERN
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			NO ANSWER
Land Use Planning Div.			MONTHLY
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			QUARTERLY
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			NO PATTERN

AGENCY NAME	QUESTION: WHAT CONDITIONS DO YOU PLACE ON THE LOAN OF YOUR EQUIPTMENT?	ANSWER
STATE BOARD OF EDUCATION		
Museum Program		MUST SIGN IT OUT
FISH AND GAME		
Film Center		WOULD PERMIT USE BUT HAVE HAD BAD EXPERIENCES-WILL LIMIT USE TO DEPT. OF HEALTH
HEALTH AND ENV. SCIENCES		
Film Library		
Solid Waste Mngt. Bureau		
DEPT. OF HIGHWAYS		
Personnel Division		
Preconstruction		NO SPECIAL CONDITIONS
DEPT. OF INSTITUTIONS		
Alcohol and Drug Abuse Div.		REPAIR OR REPLACE, PROVIDE SECURIT
Warm Springs		PROVIDE OPERATOR
Boulder River School		
Eastman Training Center-Glendive		
Galen		
Corrections		RETURN IN SAME CONDITION OR REPAIR
DEPT. OF JUSTICE		
Highway Patrol		
Law Enforcement Academy		RETURN CLEAN AND IN WORKING CONDITION/NO DAMAGE
LABOR AND INDUSTRY		
Employment Security Div.		PROPER CARE AND ACCEPT RESPONSIBILITY FOR DAMAGE, REPAIR, REPLACE
Worker's Compensation Div.		CONDITIONS SET BY DEPT. HEAD
Centralized Services/Training & Compliance		RETURN IN EXCELLENT CONDITION
NATURAL RESOURCES AND CONSERVATION		
Renewable Energy Bureau		WILLING TO MAKE EQUIP. AVAILABLE
Land Use Planning Div.		PRESENTLY BEING FORMULATED
SOCIAL AND REHABILITATION SERVICES		
T.R.I.C.		BE RESPONSIBLE FOR LOSS OR DAMAGE
OFFICE OF PUBLIC INSTRUCTION		
Library Media Component		EQUIPTMENT RENTED BUT NOT TO LEAVE HELENA

AGENCY NAME	QUESTION	FOR FUTURE PURCHASES, WOULD YOU BE WILLING TO ACQUIRE HARDWARE JOINTLY WITH ANOTHER AGENCY AND SHARE THE ITEM?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO
FISH AND GAME			
Film Center			NO
HEALTH AND ENV. SCIENCES			
Film Library			NOT PERMITTED/GENERALY NOTPOSSIBLE
Solid Waste Mngt. Bureau			YES
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			NO ANSWER
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			NO
Warm Springs			NO ANSWER
Boulder River School			NO
Eastman Training Center-Glendive			YES
Galen			NO ANSWER
Corrections			YES
DEPT. OF JUSTICE			
Highway Patrol			YES
Law Enforcement Academy			YES
LABOR AND INDUSTRY			
Employment Security Div.			NO
Worker's Compensation Div.			ADMINISTRATIVE DECISION N/A
Centralized Services/Training & Compliance			NOT APPLICABLE
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			YES
Land Use Planning Div.			YES
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			YES
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			NO ANSWER

AGENCY NAME	QUESTION	WHAT SPECIAL CONDITIONS WOULD YOU SET FOR JOINT PURCHASE AND OWNERSHIP?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			
FISH AND GAME			
Film Center			
HEALTH AND ENV. SCIENCES			
Film Library			
Solid Waste Mngt. Bureau			NO ANSWER
DEPT. OF HIGHWAYS			
Personnel Division			
Preconstruction			
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			
Warm Springs			
Boulder River School			
Eastman Training Center-Glendive			TO BE WORKED OUT
Galen			
Corrections			50% USE
DEPT. OF JUSTICE			
Highway Patrol			UNKNOWN
Law Enforcement Academy			AVAILABLE TO LAW ENFORCEMENT UNITS
LABOR AND INDUSTRY			
Employment Security Div.			
Worker's Compensation Div.			QUESTIONS WOULD HAVE TO BE WORKED OUT ON POLICY LEVEL
Centralized Services/Training & Compliance			
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			
Land Use Planning Div.			COMPATABLE AND COMPLIMENTRY UNDECIDED
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			UNKNOWN
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			

AGENCY NAME	QUESTION	DOES YOUR AGENCY USE 35mm SLIDE SHOWS FOR? 1-STAFF TRAINING, 2-PUBLIC MEETINGS, 3-TELEVISION PSA's	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			1,2,3
FISH AND GAME			
Film Center			2
HEALTH AND ENV. SCIENCES			
Film Library			1,2,3
Solid Waste Mngt. Bureau			1,2
DEPT. OF HIGHWAYS			
Personnel Division			-
Preconstruction			1
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			2
Warm Springs			1,2
Boulder River School			1
Eastman Training Center-Glendive			-
Galen			-
Corrections			-
DEPT. OF JUSTICE			
Highway Patrol			-
Law Enforcement Academy			1
LABOR AND INDUSTRY			
Employment Security Div.			1,2
Worker's Compensation Div.			-
Centralized Services/Training & Compliance			-
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			1,2
Land Use Planning Div.			1,2
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			1,2
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			-

AGENCY NAME	QUESTION	DOES YOUR AGENCY USE 35mm SLIDE SHOWS FOR? 1-STAFF TRAINING 2-PUBLIC MEETINGS 3-TELEVISION PSA's	ANSWER
ADMINISTRATION			
Communications Division			-
DEPARTMENT OF AGRICULTURE			
Directors Office			1,2,3
OFFICE OF THE GOVERNOR			-
DEPARTMENT OF LANDS			
COMMISSIONERS OFFICE			1,2
DEPARTMENT OF HIGHWAYS			
Photo Unit			1,2,3
Travel Promotions			-
DEPARTMENT OF JUSTICE			
Fire Marshal			1
Criminal Investigation Bureau			-
Board of Crime Control			-

AGENCY NAME	QUESTION: DO YOU HAVE STAFF TO PRODUCE 35mm PRESENTATIONS?	ANSWER
STATE BOARD OF EDUCATION		
Museum Program		YES
FISH AND GAME		
Film Center		YES
HEALTH AND ENV. SCIENCES		
Film Library		YES
Solid Waste Mngt. Bureau		YES
DEPT. OF HIGHWAYS		
Personnel Division		NO ANSWER
Preconstruction		YES
DEPT. OF INSTITUTIONS		
Alcohol and Drug Abuse Div.		NO
Warm Springs		NO
Boulder River School		NO
Eastman Training Center-Glendive		NO ANSWER
Galen		NO ANSWER
Corrections		NO ANSWER
DEPT. OF JUSTICE		
Highway Patrol		NO ANSWER
Law Enforcement Academy		NO
LABOR AND INDUSTRY		
Employment Security Div.		NO
Worker's Compensation Div.		NO/ACTIVITY
Centralized Services/Training & Compliance		NO/ACTIVITY
NATURAL RESOURCES AND CONSERVATION		
Renewable Energy Bureau		YES
Land Use Planning Div.		NO
SOCIAL AND REHABILITATION SERVICES		
T.R.I.C.		NO
OFFICE OF PUBLIC INSTRUCTION		
Library Media Component		NO

AGENCY NAME	QUESTION	DO YOU HAVE STAFF TO PRODUCE 35mm PRESENTATIONS?	ANSWER
ADMINISTRATION			
Communications Division			NO
DEPARTMENT OF AGRICULTURE			
Directors Office			YES
OFFICE OF THE GOVERNOR			NO-HOWEVER DOES HAVE EQUIPTMENT
DEPARTMENT OF LANDS			
COMMISSIONERS OFFICE			NO-HOWEVER DOES HAVE EQUIPTMENT TO LEND OUT
DEPARTMENT OF HIGHWAYS			
Photo Unit			YES
Travel Promotions			NO
DEPARTMENT OF JUSTICE			
Fire Marshal			YES
Criminal Investigation Bureau			NO-HAS EQUIPTMENT,NO STAFF,NO CONTRACTING
Board of Crime Control			YES

AGENCY NAME	QUESTION	DO YOU CONTRACT 35mm WORK? IF YES, HOW OFTEN? IF YES, FOR WHAT TYPE PROJECT?	ANSWER
STATE BOARD OF EDUCATION			
Museum Program			NO
FISH AND GAME			
Film Center			NO
HEALTH AND ENV. SCIENCES			
Film Library			YES/PSA's & TRAINING, SEVERAL
Solid Waste Mngt. Bureau			NO
DEPT. OF HIGHWAYS			
Personnel Division			NO ANSWER
Preconstruction			NO
DEPT. OF INSTITUTIONS			
Alcohol and Drug Abuse Div.			NO
Warm Springs			NO
Boulder River School			NO
Eastman Training Center-Glendive			NO
Galen			NO
Corrections			NO
DEPT. OF JUSTICE			
Highway Patrol			NO ANSWER
Law Enforcement Academy			NO
LABOR AND INDUSTRY			
Employment Security Div.			NO
Worker's Compensation Div.			NO
Centralized Services/Training & Compliance			NO
NATURAL RESOURCES AND CONSERVATION			
Renewable Energy Bureau			NO
Land Use Planning Div.			NO
SOCIAL AND REHABILITATION SERVICES			
T.R.I.C.			NO
OFFICE OF PUBLIC INSTRUCTION			
Library Media Component			NO

AGENCY NAME	QUESTION	ANSWER
	DO YOU CONTRACT 35mm WORK? IF YES, HOW OFTEN? IF YES, FOR WHAT TYPE PROJECT?	
ADMINISTRATION		
Communications Division		NO
DEPARTMENT OF AGRICULTURE		
Directors Office		YES,SELDOM, PUBLIC MEETINGS
OFFICE OF THE GOVERNOR		NO
DEPARTMENT OF LANDS		
COMMISSIONERS OFFICE		NO ANSWER
DEPARTMENT OF HIGHWAYS		
Photo Unit		YES, SELDOM
Travel Promotions		YES, SELDOM
DEPARTMENT OF JUSTICE		
Fire Marshal		NO
Criminal Investigation Bureau		NO ANSWER
Board of Crime Control		NO

AGENCY NAME	QUESTION: DO YOU PRODUCE 16mm FILMS?	ANSWER
STATE BOARD OF EDUCATION		
Museum Program		NO
FISH AND GAME		
Film Center		YES
HEALTH AND ENV. SCIENCES		
Film Library		NO
Solid Waste Mngt. Bureau		1 ANNUALLY FOR TELEVISION
DEPT. OF HIGHWAYS		
Personnel Division		NO ANSWER
Preconstruction		NO
DEPT. OF INSTITUTIONS		
Alcohol and Drug Abuse Div.		NO
Warm Springs		NO
Boulder River School		NO
Eastman Training Center-Glendive		NO
Galen		NO
Corrections		NO
DEPT. OF JUSTICE		
Highway Patrol		NO ANSWER
Law Enforcement Academy		NO
LABOR AND INDUSTRY		
Employment Security Div.		NO
Worker's Compensation Div.		NO
Centralized Services/Training & Compliance		NO
NATURAL RESOURCES AND CONSERVATION		
Renewable Energy Bureau		NO
Land Use Planning Div.		NO
SOCIAL AND REHABILITATION SERVICES		
T.R.I.C.		NO
OFFICE OF PUBLIC INSTRUCTION		
Library Media Component		NO

AGENCY NAME	QUESTION DO YOU PRODUCE 16mm FILMS	ANSWER
ADMINISTRATION		
Communications Division		NO
DEPARTMENT OF AGRICULTURE		
Directors Office		NO
OFFICE OF THE GOVERNOR		NO
DEPARTMENT OF LANDS		
COMMISSIONERS OFFICE		NO
DEPARTMENT OF HIGHWAYS		
Photo Unit		NO
Travel Promotions		NO
DEPARTMENT OF JUSTICE		
Fire Marshal		NO
Criminal Investigation Bureau		NO
Board of Crime Control		NO

QUESTION	ANSWER
IF YES, HOW OFTEN 16mm WORK?	
FISH AND GAME Film Center	ANNUALLY
HEALTH AND ENV. SCIENCES Solid Waste Mngt. Bureau	ANNUALLY
IF YES, FOR WHAT TYPE OF PROJECT?	
FISH AND GAME Film Center	FOR TELEVISION AND PUBLIC SHOWINGS
HEALTH AND ENV. SCIENCES Solid Waste Mngt. Bureau	FOR TELEVISION AND PUBLIC MEETINGS
DO YOU HAVE A FILMMAKER ON STAFF?	
FISH AND GAME Film Center	YES
HEALTH AND ENV. SCIENCES Solid Waste Mngt. Bureau	NO
DO YOU CONTRACT 16mm WORK?	
FISH AND GAME Film Center	NO
HEALTH AND ENV. SCIENCES Solid Waste Mngt. Bureau	YES
HOW OFTEN 16mm CONTRACTED, AND FOR WHAT TYPE WORK?	
HEALTH AND ENV. SCIENCES Solid Waste Mngt. Bureau	ONE ANNUALLY

ATTACHMENT E

PART VII

APPENDIX 1-C: DESCRIPTIONS OF AGENCIES COVERED IN-DEPTH

Department of Social Rehabilitation
Services
Training Rehabilitation Information Center
Ted Spas

The Training Rehabilitation Information Center, TRIC, has been serving Social Rehabilitation Services for several years. As the successor to the Developmentaly Disabled Training Institute, TRIC inherited a black & white production system with reel-to-reel editing and 3/4 inch record/playback ability. TRIC produces one B & W training tape quarterly and distributes the product to the five regional offices of SRS's Developmental Disabilities Division: each divisional office has a Sony Rover with Monitor system.

Over the years, TRIC has established a reciprocal relationship with the Office of Public Instruction's Library Media component. The center duplicates and distributes training tapes in ½ and 3/4 inch formats; duplication activities are extensive.

Besides responsibilities for video, the three staff members of the Center distribute film and hard copy software.

The B & W system at TRIC is a coherent 2 camera switchable system. The Center has a B & W vertical interval switcher with monitors mounted in a portable cabinet.

Department of Fish & Game
Film Production Unit
Mike Gurnett

As described earlier in the report, Fish & Game has a substantial 16mm effort. Presently, the production unit is finishing one 28 min. film and planning another. With limited staff, production emphasis is being placed on Public Service Announcements.

Knowledge of how to use a 16mm camera is not localized in the production unit; other Fish and Game personnel use the cameras to document field work, collect footage on wildlife and shoot file footage for inclusion in future documentaries and training films.

In 1980, Fish & Game Saftey & Training Bureau considered acquiring a video field unit with editing; however, other priorities prevented any purchases being made. An interest still remains to acquire video for taping field work and producing hunter saftey public education programs.

Department of Institutions
Programing Services Division
John Thomas

Sub units within the Department of Institutions use television as a therapy tool with clients in programs and hospitals. A preference seems to exist for pre-produced software rather than in-service production of training materials. On occasion, a training program will be contracted, the most recent under discussion, one to be produced by the production unit of MSU.

For the most part, the equipment used in the department is B & W; however, given its purposes, this type of utilization does not argue for sophisticated color systems and, given the cinema verite qualities of B & W, a non color use might be preferred in therapy situations.

Department of Justice
Highway Patrol
Bill Erwin & Robert Fears

The Highway Patrol is in the process of detailing specifications for a modest ½inch cassette in-house production-field training system. The Patrol is aware that personnel costs and travel expenses are reaching a point where television can offer cost effeciencies. The system will involve in-house production with some field work--the finished product to be bicycled to Highway Patrol training centers.

Television production would be used in recruiting programs, employee orientation, First Responder Programs and bicycling explanations of new reporting proceedures, etc. The Patrol favors the Beta format.

Department of Conservation
Natural Resources
Information Officers
Jim Bond & Tom Livers

The Energy Divison of DNRC manages Montana's Alternate Renewable Energy Progam in it Renewable Energy Bureau. The Renewable Energy Program was five years old in 1980; at that time, the "RE" Bureau concluded that Montana citizens were not as well informed as they could be about the program and what it offered. In order to better inform the public about the scope and accomplishments of the program, the Bureau arranged for the production of two 30 minute video programs for possible airing on Montana stations: this project allowed the agency to acquire the 3/4 inch editors.

The experience gained for these two experimental programs has led the Bureau to plan television which emphasizes programing for public meetings, fairs, public service announcements, etc.

While the pilot project allowed acquiring editors, no field 3/4 inch system was purchased. The agency has expressed interest in trading access to a compatable field system for access to their editors.

The Land Use Planning Division of DNRC is responsible for writing environmental impact statements for Montana's energy projects. The Divison uses television recording and playback for remote sensing, using a video digitizing device which density slices infra-red spectral and thermal information. Besides this specialized application, the Divison has an interest in developing some level of in-house expertise to produce segments of environmental impact statements--issues, analysis of data, etc.-- as a tool for facilitating public comment at public meetings.

Department of Health & Environmental
Sciences
Planning & Evaluation Unit
Robert Solomon

The Planning & Evaluation Unit manages an information library for the agency and city/county program participants, lending film, hardcopy and television software. The library produces in B & W, does duplicate 3/4 to 3/4 on a fairly frequent basis.

The Solid Waste Management Bureau has produced in-house training tapes, but has not been satisfied with quality. There is a recognition that untrained equipment operators have their limits.

Many hardware items acquired by the library have use limitations placed on them by the federal granting agencies; these limitations sometimes prevent multiple use of equipment and lending. Perforce, such federal policies hamper planning integrated systems.

A PROPOSAL
FOR AN AUDIO AND DATA
TELECOMMUNICATIONS NETWORK
IN MONTANA

by CHARLES BICKENHEUSER

AGRARIAN CONSULTATIONS

BOX 547, HARLEM, MT 59526

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The Social Framework of the Information Society
by Daniel Bell, The MIT Press; 1980 ..... G

EXECUTIVE SUMMARY

This report is written for the manager who does not have a technical background. This is seen by the author as the only practical method for the dissemination of information that, at its core, is highly technical in nature but, because of its technology, has great need to be understood first in everyday 'people' terms before full and proper use of any technical system can be realized. This approach will also keep the focus on systems deployment, use and benefit.

This proposal sets forth an audio and data telecommunications network called the Montana Information Network (MIN) deploying sixteen "as needed", or part-time, Teleconference Centers with audio and facsimile entry points and eleven Community Information Offices providing audio, facsimile and data entry points on a full-time basis. Ninety-eight percent of Montana residents are within a two hour drive of a Community Information Office and 90 percent of the population is within a fifteen to twenty minute drive of any audio telecommunications entry point.

The Montana Information Network was designed to meet the needs of three seperate groups of users in four configurations. The users are 1) the general public, 2) the legislative branch, and 3) the executive branch. User configurations are 1) teleconferencing for state agencies, 2) data base and audio teleconferencing entry points for the general public, 3) legislative interaction with the public, and 4) executive interaction with the public. Data base entry points

located in the Community Information Offices will offer more than 500 million reference citations in several areas of interest: Agriculture, business, veterinary and general medicine, economics, legislation (state and federal), energy, environment, forestry, ranching, the social sciences and electronics.

In addition, all offices may make use of video tapes, electronic blackboards, and other technologies on an expanded basis.

The MIN does not address the more specific and extensive needs of the judiciary and educational apparatus. The systems design needs of those institutions are in many ways incompatible with the MIN design. The MIN is a good compromise between state versus public use, cost factors, geographical realities, and competing technologies. All branches of government, however, would have access to the MIN. The judiciary and educational apparatus require systems specifically designed to meet their geographical, hardware, security, personnel, and usage requirements.

First year systems cost is estimated at $1,378,000. ($370,000 is for one-time purchase of equipment) saving the state $3,413,000 in travel costs and $787,000 in salary costs by reducing in-state travel of government employees 30 percent. This does not take into account increased productivity by both private and public sectors.

The real benefit of any telecommunication system for audio and data interfacing comes not just from monetary savings but from an increase in information retrieval and an increase in dialogue.

INTRODUCTION

In the main, this project is concerned with the "how to" of audio and data telecommunications; in reality, however, that is only part of the story. The development of computer and telecommunication links during the last decade has been referred to as the second industrial revolution. The analogy, in general, runs something like this: during the first industrial revolution, man made machines to do much of the work previously done by hand. Today, in the second industrial revolution, man is building machines (computers) to assist intellectual processes. To be sure, there are thinking computers so-called that emulate creative mind functions, but only a few shared between a handful of universities. What this project is concerned with, and what businesses and most scientific communities use, are data computers - computers that store and manipulate information numbered in the billions upon billions of separate, individually identifiable units. Computers do well what humans cannot, namely, handle large amounts of information with both speed and economy. Today, computers can send and receive the Old and New Testaments of the Bible in one-thousandth of a second, plus a transmission time of six billionths of a second over a satellite transmission link between New York and San Francisco.

Computers can search a data base (a collection of information) for specific words not listed in conventional indices. A search can be conditional in regards to date, period, and configuration with other criteria such as author, other words and page, paragraph or sentence association. A researcher, working with several volumes can pull and record perhaps a hundred reference citations in one hour. A data terminal can pull, and have recorded, a thousand or more specific citations in just two or three minutes. And the more experienced one becomes with computer data base searches the more specific, and useful, are the products of a single search. The researcher, in the hour search may have used ten to twenty volumes; the computer search may have scanned ten to twenty thousand volumes.

Because of cost reductions in computer and telecommunication hardware it is now possible to effect real savings in both travel time and travel cost for private and government sectors. Typically systems should pay for their installation within a year and save 30 percent in real time and travel costs beginning in the second year following systems developement. For Montana state government this could mean a savings of three million in travel dollars alone and another savings of 50 man years for state employees. And this is only the first piece of the pie.

To be specific, the audio and data telecommuication system that this proposal has developed would establish eleven full time Community Information Offices (CIO's) and sixteen additional Teleconference Centers (TC's) for audio teleconferences on an "as needed" basis. The CIO's will have full time audio, facsimile and data capabilities. The TC's will have audio and facsimile capabilities only and use available public facilities such as libraries and schools. This system could be named the Montana Information Network and would be used by local and state government agencies, private citizens and non-profit groups. Out of state individuals and groups would also have network access. The MIN would be funded by the state. Basic design goals are fourfold: 1) a teleconferencing network for state agencies, conducting routine business, 2) a distributed data base entry point for private citizens and government employees in Montana to search for and identify information related to agriculture, economics, industry, government, energy, education and family services, 3) an economic and easily accessible means for Montana residents to communicate with, and be informed about, their state legislature and 4) a network for the executive branch to expand contact with the people it serves.

Some specific needs that can make full use of teleconferencing are legislative hearings, special interest groups working on, or identifying, specific problems (as in the area of agriculture,

veterinary medicine or energy conservation), legislative and executive work/study sessions and public hearings, emergency disaster networks, planning commissions, non-profit groups and legislative and executive news conference.

Data entry from any of the eleven CIO's can access in excess of 500 million specific citations. Most data base searches take only a few minutes and provide the user with hard copy reference sources or selected text printouts. The ability to search for information quickly and thoroughly is extremely important: today's existing data bases will double in citation content during the next two to three years. This means that by the year 1984 public data bases searches will browse one billion specific reference citations, most likely at speeds ten to a thousand times faster than at today's speeds.

The existence of audio and data points distributed throughout Montana will begin to parallel the grass roots, town-meeting concepts of democracy lost of urbanization during the last fifty to one hundred years. Much of the time and expense now lost to physical demands of travel can be decreased by the deployment and effective use of telecommunications. Problems identified, researched and perhaps solved in other areas of the world can be learned of quickly and utilized by local residents. The lag time from field research to print and

hard copy distribution can be reduced from months and years to weeks, days and minutes. Quick, effective, accurante and thorough searches for information and communication of information gained unlock the future of Montana residents. The means to find, distribute and use the vast amounts of information being generated in the world today are at hand; the will to learn about these means and use them is the central question facing Montanans today. The answer to such a question points the direction Montana will take in the future.

NEEDS AND USAGE IDENTIFICATION

This first requirement phase is directed towards the people who will use any system of audio and/or data telecommunications and what they will ask such a system to do for them. In reality this phase could write itself with only a little prompting: reflect for a moment on all of the times that you have traveled to a meeting or wish you could have gone to a meeting or had people come to you for a meeting but couldn't because of lack of time or money or both. Also reflect for a moment about your needs for information and ask yourself if published reports, daily newspapers and weekly and monthly magazines supply you with enough information. If you work in a technical field does the library have all of the journals you need? If your area is applied technology, such as farming, do you have all

of the information you may need, for example, concerning weed control or grain hybirds on a world-wide basis, as weed control and grain hybirds are researched on a world-wide basis.

It is an obvious fact that audio teleconferencing saves time and money and allows for increased dialogue. Depending upon the tasks of any given business or agency audio teleconferencing can save seventy to ninety percent of all tavel, generally beginning in the second or third year of system deployment. The methodology of audio teleconferencing will be covered in detail in the requirement phase to follow, especially Technical Considerations. But for now the question as to who will use such an audio teleconference system can be answered simply: almost everyone. At first, beginning in the early evolution of use following systems deployment, audio teleconferencing systems merely replace time and travel requirements for conferences. The next evolutionary phase in usage, almost coinciding with the first, is an increase in overall teleconferencing. Groups that have, traditionally, not been able to travel to meetings can be included more often in discussions that directly effect their lives: the handicapped, the poor, senior citizens and the young now have a means to directly communicate their thoughts to business, state and federal agencies, non-profit groups and to each other.

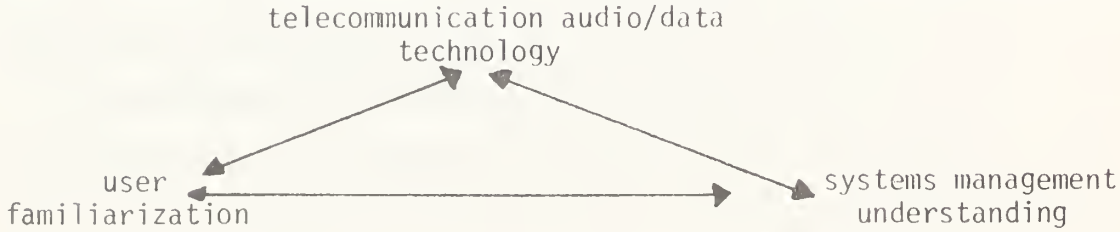
This decentralized process, as mentioned in the introduction, makes possible a more frequent and direct participation in government by Montana residents. In many applications information can be collected, or dissimanted, in a more thorough, faster and direct manner by teleconferencing than by traditional means. This, however, means the decision making process will become increasingly distributed, which brings us to an interesting point: telecommunications can decentralize communication but only management can make it distributed. In many applications management will want to share responsibility in the decision making process (this seems especially true for government). How well established management practices adapt to telecommunications systems deployment is a topic in itself and is covered in detail in the requirement phase entitled Management Considerations. However, two important facts concerning telecommunication systems deployment should be noted early on 1) the installation and implementation of telecommunication systems places great demands upon systems managers to answer increased agency and public demands for use and 2) the introduction of the general public to telecommunications must be patient and thorough. The use and understanding of telecommunication systems can truly be thought of as an evolutionary process spanning three to five years to systems maturity, both for the general public and systems managers.

The Montana Information Network was designed to meet the needs of three separate groups of users in four configurations. The users are 1) the general public, 2) the legislative branch and 3) the excutive branch. The user configurations are 1) teleconferencing for state agencies, 2) data base and audio teleconferencing entry points for the general public, 3) legislative interaction with the general public and 4) executive interaction with the general public.

Several authors have recognized the advantages to decentralization: local control, closeness to user needs, greater user accessibility and an opportunity for the user (private sector as well as public) to become more intimately familiar with and capable in the use of telecommunications (King, 1980). Mangement distribution follows such systems familiarization. The overall assumption is that traditional productivity will be enhanced. Some systems already automated and matured report administrative cost reductions at one thousand to one (Coleman and Riley, 1977). The challenge facing the deployment and use of telecommunications systems in Montana is to extend to the general public the same corporate benefits realized by government and business. Benefits that include not only time and costs reduction in present day, traditional transactions but benefits that allow people to increase their productivity and enhance their knowledge in areas of interests.

The sixteen Teleconference Centers (the "as needed" audio sites) and the eleven, full time Community Information Offices, with audio and data entry points, will allow any user the opportunity to receive or transmit information concerning, to name a few, farming, ranching, energy, tourism, community and regional/state planning, the environment, government (local, state, intra-state, federal) any of the non-profit and public action groups and education. In essence, what ever needs there that must be communicated between people can be communicated over teleconference networks with increased efficiency over conventional means of communication (travel time and expense, loss of personnel time, point to point telephone conversations, bulk mailings.) In this configuration needs determine usage: the more familiar systems managers and the general public become with telecommunications deployment the greater the usage of deployed systems becomes.

Telecommunication systems deployment success depends upon three central elements:



This round-robin operational mode is weighted only by user needs. User familiarization and training is covered in the requirement phase entitled Training and Familiarization but it is well to note that if the user is introduced to audio and data entry points with some sincerity and patience on the part of management staff the user quickly adapts to the teleconference procedure.

SITE SELECTION

Site selection was measured by two considerations: 1) population distribution and 2) geographical considerations. The goal is to have Teleconference Centers (the "as needed" audio conference sites) and the Community Information Offices (full time data/audio centers) placed throughout the state to allow the greatest number of people access to data and audio entry points: The Community Information Offices (CIO's) are placed in the larger cities, the Teleconference Centers (TC's) in the mid-size rural towns. Four of the CIO's are in cities that have populations of 30,000 to nearly 70,000: the remaining seven CIO's are in cities whose populations are generally numbered between 10,000 to 24,000 people with one exception. All sixteen of the TC's are in towns that have populations between 2,000 to 7,000 people, except one, with the main populations between 3,000 to 4,000 people. As will soon be evident 45 percent of Montana residents are within a fifteen minute drive of any audio entry point (TC's

and CIO's), and 36 percent of the states residents are within a similar fifteen minute drive for both data and audio entry points (the CIO's).

The population figures are from the 1980 census. The city and town populations, as well as the total state population, has been reported, but not the county populations. Therefore, the city population figures are inclusive of city limits only. It is, however, a reasonable and safe assumption to say that more people live closer to a city limit than otherwise, such being the nature of urban development.

The eleven CIO sites are:

Billings	66,800
Great Falls	56,700
Butte	37,200
Missoula	33,400
Helena	23,900
Bozeman	21,600
Havre	10,900
Kalispell	10,700
Miles City	9,600
Lewistown	7,100
Wolf Point	3,100
	281,000 (36% of total state population)

The sixteen TC sites are:

Anaconda	12,500	
Livingston	7,000	
Glendive	6,000	
Sidney	5,700	
Laurel	5,500	
Glasgow	4,500	
Deer Lodge	4,000	
Dillon	3,900	
Cutbank	3,700	
Whitefish	3,700	
Hardin	3,300	
Shelby	3,100	
Conrad	3,000	
Hamilton	2,700	
Baker	2,400	
Roundup	2,100	
	73,100	(9% of total state population)

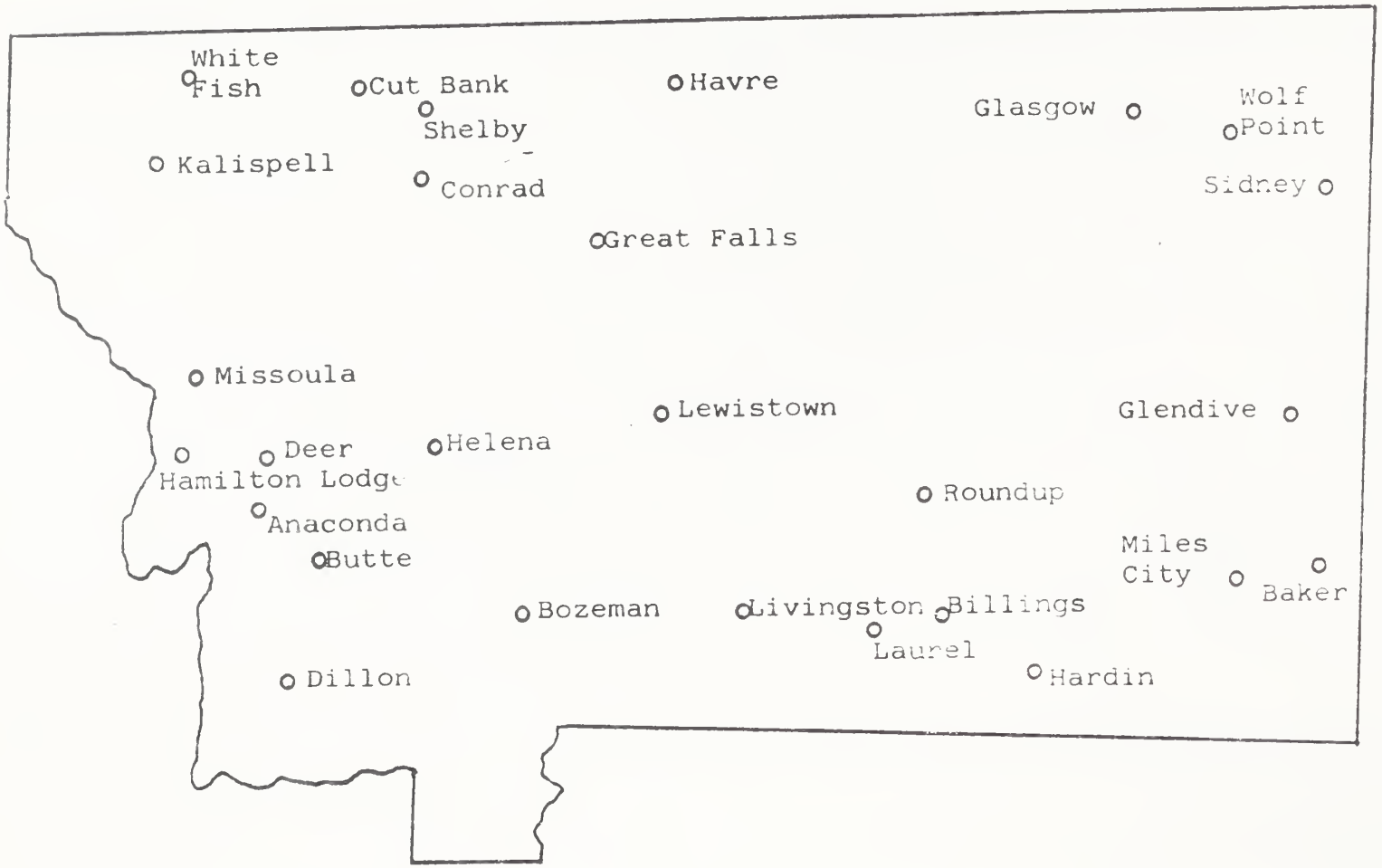
The population distribution breaks down as follows:

Community Information Offices	36%
Teleconference Centers	9%
	45% of total state population

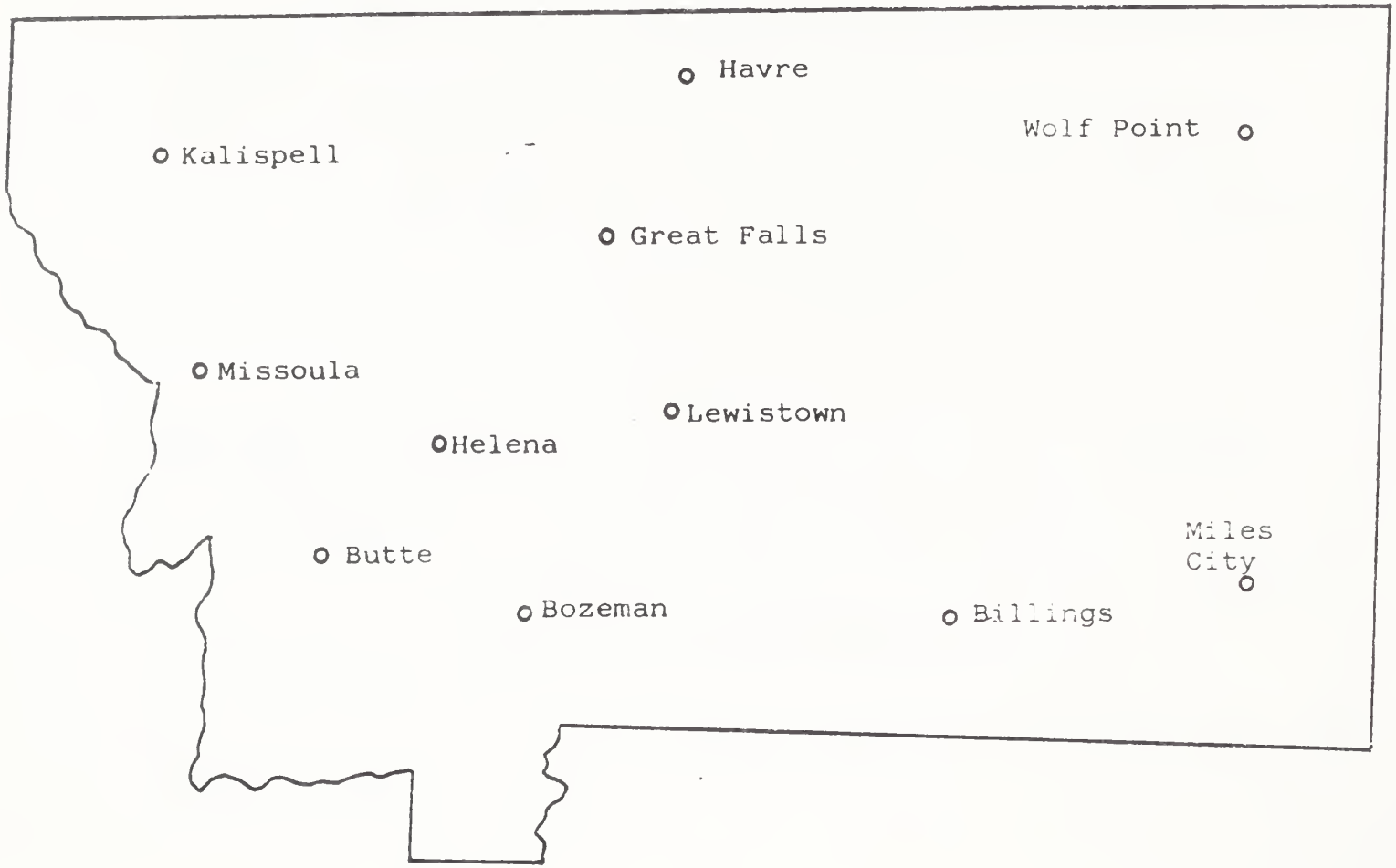
As the population figures for the data and audio entry points are for people living inside the city limits it is likely that 60 to 80 percent of the states total population could be within a thirty minute drive (at a maximum) of an audio entry site (CIO's and TC's). Perhaps as much as 60 to 70 percent of the states total population could also be within a thirty minute drive (again at a maximum) of audio and data entry points (the CIO's). This is only an estimate as the county population figures for the 1980 census have not been reported at the time of this writing.

The geographical breakdown is as follows: six of the eleven (or 55%) of the Community Information Offices are in the eastern two-thirds of Montana. Eleven of the sixteen (or 69%) Teleconference Centers are also in the eastern part of the state. Both CIO's and TC's need a population base to support teleconferencing and data entry operations. For this reason the full time Community Information Offices were placed in the larger cities with the exception of Miles City, Lewistown and Wolf Point. These three cities, especially Wolf Point, balance out geographical distribution requirements. In this regards a design goal was to place 98 percent of the state within a one hundred mile radius, or less (or two hours driving time maximum), of at least one Community Information Office. It was also a design goal to place 75 percent of the land mass of Montana

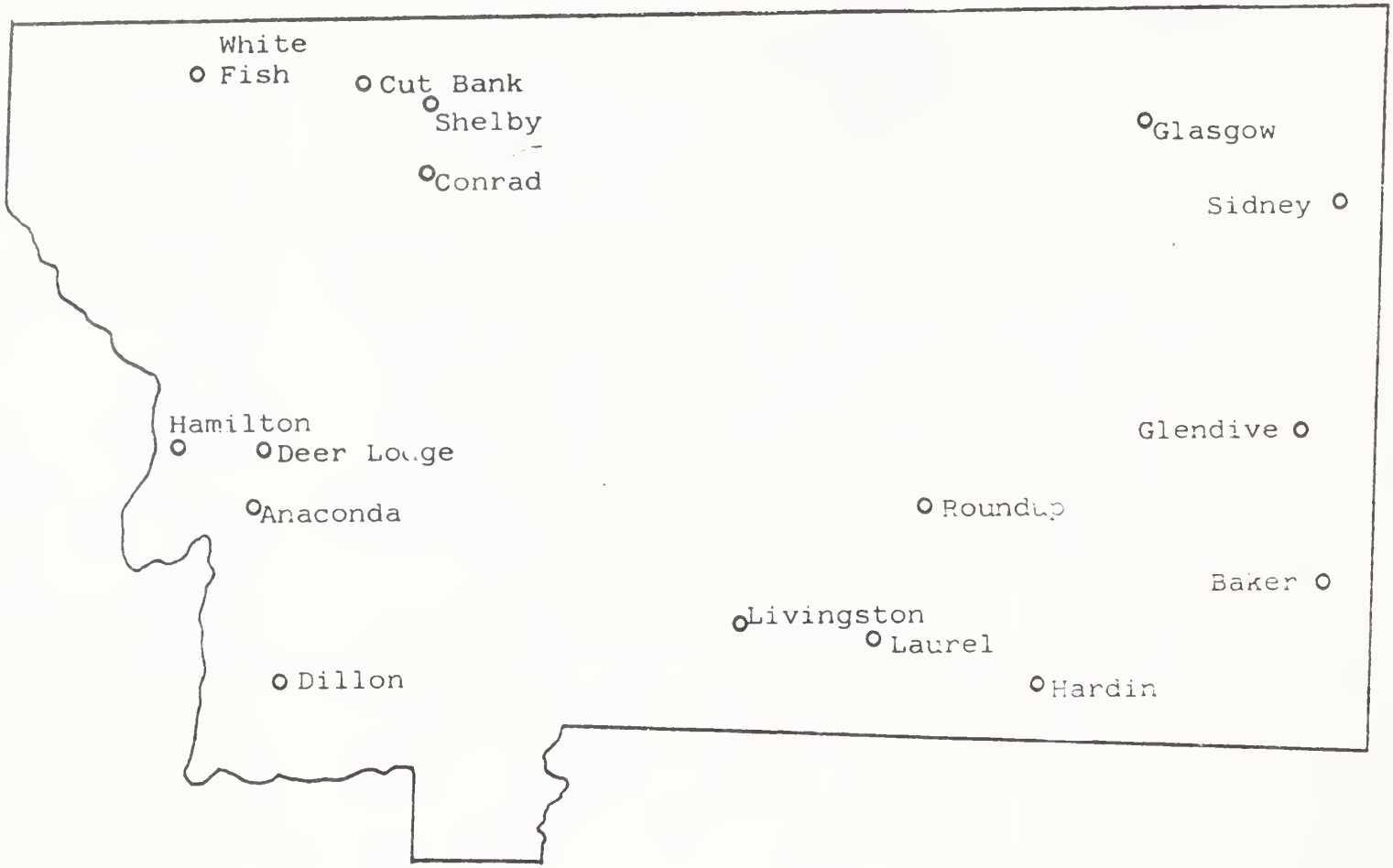
AUDIO ENTRY POINTS (Both Community Information Offices and Teleconference Centers)



COMMUNITY INFORMATION OFFICES (Audio and Data Entry Points)



TELECONFERENCE CENTERS (Audio Entry Points Only On An "As Needed Basis")



within a fifty mile radius, or less (or one hours drive maximum), of an audio teleconference site (either TC or CIO site). Both of these design goals have been met. Also noted is the fact that the remaining 25 percent of the land mass is within a 75 mile radius, or less, of any audio entry point. Those areas that are the greatest distance from either a Community Information Office or Teleconference Center most likely comprise from five to ten percent of the states total population.

The Teleconference Centers and Community Information Offices are located in areas that will give the residents of Montana quick and efficient access to audio teleconferencing and data base access. As will be covered later on in this report residents can telephone local Community Information Offices (generally a local call) for many information requests. This configuration increases systems usage. In all the balance of population and geographical distribution described should support the many needs that a telecommunications system such as the Montana Information Network will help address.

DATA BASES AVAILABLE FOR LINKAGE

This requirement phase covers the data bases that will be available) generally over a switched line (a standard telephone line that is dialed from the site requesting information), from each of the eleven Community Information Offices. Data bases are large banks of information held in memory in a computer. They contain in-

formation on a number of fields and can be cross-referenced by the computer operator for economy of time and cost savings. Most data bases can be searched, that is scanned or browsed, in a matter of minutes compared to hours for manual searches that might yield the same information. It is also typical for computer data base searches to search ten to a thousand or more the number of reference works that would be searched by hand for a given time period.

Libraries throughout the world provide citations in the form of card catalogs, bibliographies and other indices for information location and retrieval. As such manual searches, due to time restrains, limited staff, physical plant size, reference sources on hand and the lag time to print, make it virtually impossible for a complete cross-referenced source citation list to be produced. Computer data base searches make it possible, by bringing together in a few data bases, all of the information found in hundreds to thousands of sources. The memory of a data base computer can hold millions of words of print on a disc, a device that looks much like a phonograph record, by electronic means. This "electronic memory" can be arranged in several different formats for display on a computer terminal and/or print on a computer printer. (Computer printers operate at speeds of several inches per second to several feet per second.)

In the appendix entitled A Sample Listing of Available Data Bases more than 150 data bases are listed with a topical description. However, data bases cover most any area of interest. A few are:

- Agriculture
- Business
- Medicine (veterinary and general medicine)
- Economics
- Legislation
- Energy
- Environment
- Forestry
- Ranching
- Social Sciences
- Electronics

Information is gathered and recorded in data bases from:

- Journals
- Books
- Thesis
- Conference Papers
- Patents
- Annual Reports
- Maps
- Contracts
- Grants
- Government Legislation
- Hearings
- Newspaper Articles
- Summaries of Research in Progress
- Statistical Data
- Voting Records
- Reviews

The following is a list of the companies or agencies offering more than five thousand data bases available for searches at the present time:

Systems Development Corporation

National Agricultural Library

Nat. Library of Medicine

Bibliographal Retrieval Service

Lockhead Information System

Information Access

Washington Library Net

Pacific Northwest Bibliographical Center

Library of Congress

National Union Congress Library Center

Legis-Late

West Law

Lexis

In many cases a full abstract or summary of the document requested can be printed at the requesting site.

Another option would be to have the document(s) printed at the computer site and air mailed the same day. This provides management flexability in each Community Information Office. Other options allow for the document to be requested directly from the originating source during the search. In this mode the vendor mails you a copy and bills the Montana Information Network directly.

As mentioned in the opening paragraph these several data bases are accessed over standard telephone lines; however, state tie-lines or WATS lines can be used in association with national networks such as TYMNET OR TELENET at costs of between five to eight dollars per hour. The costs per data base range from $35 to $300 per hour of connect time (straight time) with the average being about $70 per hour for most data bases. A few of the data bases are available from the federal government at no charge, other federal data bases must charge a small user fee as mandated by law. Again, most data base searches take only a few minutes.

Once information from any of the CIO's has been recorded locally it is then sent to Helena and compiled on the Montana Information Network's own data base. This will generally mean that once a specific question has been asked from any CIO and recorded in Helena no one need go to the same data base again for the same question. This depends on the copy-right attached to each data base. In this configuration information will be requested first from the Montana Information Network data base in Helena and if not found in the Helena data base then the user will dial-up the data base(s) of interest, again from any CIO site.

All of the data bases use simple, common sense English commands for searches. The user must only have a good working knowledge

of English to access, search, print-out and sign off of any data base for the information requested. It is the job of the Information Officer to assist the user as required. Experience has shown that if the general public is introduced to computer terminal operations in a patient and low-keyed manner the frequent user requesting information needs little or no assistance during future searches.

TECHNICAL CONSIDERATIONS

Technical considerations take into consideration two main areas of interest: 1) audio and data terminal equipment and 2) network line configurations. Heavy consideration is given to future adaptability for systems growth and expansion for DTE (data terminal equipment). In this report network configuration was based on present day state-of-the-art transmission in Montana, which, for the most part, is in the early stages of systems development. The option of designing another network configuration would not be ased in reality for systems deployment or costs analysis. Also, design characteristics are listed generically.

Audio Teleconference Equipment

The characteristics for an audio teleconference set are:

portable

dialable (can be dialed like a standard telephone)

extension microphones controlled from set

speaker with volume control

Such a set, as described above, can be carried to any room for a teleconference and be accessed from a remote site without the need for a special console or dedicated (leased) line. The only other technical requirement is that a phone jack be in the room where the teleconference is being held. An audio teleconference set that is dialable (the phone company would say that it had a "ringer") can also access another dialable teleconference, a standard telephone or a console. This adds great flexibility.

Facsimile Transceivers

Fascimile transceivers send and/or receive printed material from one point to another, generally over standard telephone lines. The characteristics for a facsimile transceiver are:

portable

speed compatibility

A portable facsimile transceiver can be used in association with any audio teleconference equipment. Portable units are hand fed

one sheet at a time and take anywhere from one to six minutes to either send or receive a single page. The latest models use the faster speed; however, speed compatibility is necessary when transceivers designed for differing transmission speeds are used on the same line.

The facsimile transceiver used for the Helena office is not portable and can be dialed by a remote site and receive copy without an operator present. Such a dialable unit can send several copies to a portable unit without operator assistance once the machine has been loaded and the portable, remote unit dialed. In a central office this time saving option is of great value.

Data Terminal Equipment (DTE)

Data terminal equipment most often refers to the computer terminal but also refers to any equipment at the end of a telecommunication link (generally a cable or telephone line) terminating in an office. This includes modems, printers, CRT's, keyboards, software interfaces ("cards") and the like.

The computer terminal must be interactive, that is carry on a "conversation" with the computer processing unit (CPU) that it is connected to at the other end of the telecommunication link or another interactive computer terminal. The terminal must

also be buffered (able to store information entered into the terminal and transmitted as one single unit instead of character by character to the CPU or another terminal) and able to talk in a synchronous or asynchronous mode at speeds of 2400 baud for synchronous transmissions or 1200 for asynchronous transmissions. The synchronous 2400 baud will be used for intra-state transmission and the 1200 baud line speed for out-of-state data base connections in an asynchronous mode.

The computer terminal must be able to use one of two "modems" (a modem makes it possible for a computer terminal to talk to a CPU or another computer terminal over standard telephone line by modulating and demodulating analog and digital wave forms): the 1200 baud asynchronous for out-of-state data bases and the 2400 baud in-state synchronous transmissions to the data base in Helena.

A letter-quality printer is necessary for office automation and replaces the standard office typewriter. Such a printer should also be able to use a tractor feed for copying large amounts of data on fan folding paper. It is also important that letterheads be automaticlly feed to the printer. Such labor saving devices reduce secretarial time by margins of forty to one.

THE CRT (video screen) should be able to display 128 character per line and 24 lines per screen. The keyboard should be of good typewriter quality for fast typing and offer optional keys for screen and program maniuplation.

The terminal should function as a stand-alone unit for local office administrative functions and will require space for program and file storage. This can be done on a hard disc located in the Helena office and serving all terminal users or memory can be provided in the local office on "floppy" disc. The local memory, or floppy disc, will provide an advantage in being independent of system failure in a central location or other reasons for system down time (program editing, telecommunication link failure.) For these reasons two floppy disc are recommended (one for the program memory and the other for the local information file.) This two disc configuration is a proven operational mode for stand-alone units.

Software, or systems program(s), should provide the following:

- test processing
- report processing
- communications (asynchronous/synchronous)
- math/statistics computations
- electronic mail (terminal to terminal messages)

As mentioned earlier both the Teleconference Centers and Community Information Offices will have audio teleconferencing equipment and facsimile transcievers. The Community Information Offices will also have the data terminal equipment. All equipment is common to the Helena office.

Network Configuration

The network design uses the existing state network which is, for the most part, point to point with a few clusters entering trunk lines in some of the larger cities of Montana. No doubt a multidrop network with multiplexing covering the state would offer advantages over point to point configurations; however, it was a design goal to use available communication links. To design and implement a new telecommunication network is another project in its own right and is simply not within the scope or time frame of this report.

Audio Teleconference Multi-Port Dial Equipment

The multi-port dial equipment is used to dial one to several audio teleconference units located in the Teleconference Centers and Community Information Offices.

Initiating communication is done simply by dialing a telephone number to call a single unit (teleconference set) or dial

more than one unit at a time as determined by programming. The multi-port dial equipment is located in Helena and is the control center for the Montana Information Network as developed by this report for audio teleconferencing. An interesting feature is that any telephone, located anyplace in the U. S., Canada or any other nation, can be patched into a teleconference.

Video Tape

While the Community Information Offices and Teleconferencing Centers could not receive and record video signals, video tape recorders may be inexpensively maintained at the site. Video Tapes are commonly used for personnel training, extention education courses and informational purposes. Used in conjunction with scheduled teleconferencing, video recorders may play a tape for participants prior to a conference to familiarize them with the subject matter at hand. The use of video tapes requires production, copying of as many tapes as there will be teleconferencing sites, and the distribution of the tapes in advance by mail, UPS, etc. The tape player would be set up and operated according to a prearranged schedule by the conference site personnel. Technically, the tapes must be compatible in size, cartridge and playing speed.

"ELECTRONIC BLACKBOARDING"

Electronic blackboard devices provide a screen surface for the reproduction of "hand written" information. The screen contains the same information at all sites, and any site may modify or add to what has been put on the board. The effect is much like an electronically shared magic writter board used by children with a non-lead pencil, which erases by lifting up the plastic sheet. The device requires an additional telephone line and central bridging equipment port for each site. The use would be unlikely to justify the expense except in special cases (i.e, engineering, etc.).

MODEL DESIGNS

This requirement will present three model designs for the Montana Information Network: 1) as needed audio teleconference sites (the Teleconference Centers noted already in this report), 2) full time audio and data telecommunication centers (Community Information Offices) and 3) one and two way real-time video interfaced into the Community Information Offices.

Teleconference Centers - Model 1

The sixteen Teleconference Centers will each use a public room (public school, library, civic center) on an as needed basis, that is when a teleconference has been scheduled for that particular location. A teleconference moderator must be recruited and trained in each of the sixteen locations and be "on call" for scheduled teleconferencing. The moderator, after receiving notice of an upcoming teleconference will place public notices as required (press, radio, community bulletin boards, telephone calls, mailings), arrive at the teleconference site thirty minutes before the hearing or meeting begins and set up the equipment which consists of a portable teleconference set, a portable facsimile transceiver and possibly a video tape player. The moderator, once connected into the teleconference network by Helena personnel, will then make an audio check of

the teleconference set and then inform the chairman or group leader of the number of participants expected to be present for the teleconference. The moderator, acting as an extension of the teleconference chairman or leader, may assist the chairman as he or she requires, that is explaining the need for site rotation of speakers, time limits, a call for, or distribution of, documents, teleconference sign-ins and the like. This is the basic teleconference site operation.

Other duties of the Teleconference Center moderator will be to make daily teleconference network check-ins. This can be done from the moderators home as the teleconference set needs only to be plugged into a telephone jack. The same is true for the protable facscimile transceiver. On a weekly, or bi-weekly basis, sign-in sheets and other supporting documentation will be mailed to the Helena office from each site. The moderator will also be responsible for introducing the general public to the use of the teleconference set; however, only the moderator will use the facsimile and video tape equipment.

The moderator will be paid, at a minimum, one hours wages for each daily check-in and three hours wages for each teleconference. This includes two hours of teleconference

preparation time (notice to the public, set-up time and tear-down time) for a one hour teleconference plus any additional time if the teleconference lasts longer than one hour.

These as needed teleconferences can be rotated among several of a towns public rooms. The only physical requirements are that a telephone jack be in any room used, that enough tables and chairs be provided to accommodate any participant and restroom facilities be close at hand. Of course, the more central the location and the easier its access for senior citizens and the handicapped the better. If, for example, it is known that a handicapped person will be a witness then easy access must be provided, especially if the teleconference is for handicapped people. This can often be done by selecting a site on the first floor of a building with a ramp entrance. The need for this consideration, especially during the winter months, is very helpful to the network for public support.

Community Information Offices - Model 2

The Community Information Offices will have a full time Information Officer and an Assistant Information Officer

who will be employed part time. All of the duties of teleconference moderating are identical to the Teleconference Center moderators noted above. The information Officer will be the main link of the general public to the data base entry using the interactive computer terminals in the office as well as an active promoter of both the CIO's and TC's. The last requirement demands good public speaking and writing skills and an eagerness to assist the public in seeking the information they request. Often the information will take a rather vague, ill defined request and transform the request into the correct terminology. This is especially true in the legislative process and the social science area. It is extremely important to note that this must be done with the person requesting the information in a gentle manner. In the same vein the Information Officer makes the person aware of all of the information available to the requesting party but does not formulate an opinion for, or to, the requesting party.

It is the job of the Information Officer to explain procedure without giving opinion, to assist without interference and to listen, patiently, to the needs of the public. In short, the Information Officer shows the public, when required, how to accomplish a goal, or make a point known.

The Information Officer in each CIO is the Office Manager and is responsible for recruitment and training of the Assistant Information Officer with assistance from the Helena Office. He or she must be familiar with, or become familiar with, interactive computer terminals and office automation as all of the routine office paper work will also be done on the computer terminal. In this mode there is not a need for a standard office typewriter in the office. This will reduce clerical help on the order of forty hours to one hour.

The physical size of the office will be 600 square feet and an accommodate 14 teleconference participants, plus two staff personnel. The office can serve as a meeting place for both members of the executive and legislative branches of government with limited clerical assistance. However, Information Officers are not to serve as legislative or executive staff members beyond their duties related to audio and data entry points. A non-partisan policy should be developed. This is necessary to serve all of the public well and equally. All staff, at any level in the Montana Information Network, must be free of political pressure for job recruitment and retention.

Community Information Offices - Model 3

The addition of one and two way real-time video to the CIO's is the third model. It should be noted that the addition video, especially two way real-time video, is an option that will require massive amounts of money, labor and equipment. In Montana, at the present time, no real means exists to bring a separate video channel into each CIO. Two way real-time video will add $350,000 to $400,000 per CIO plus satellite transponder costs (presently between one to three million dollars per year) if a transponder can be found for lease. The best option, for the next five years, would be one way video originating from Helena using commercial television studios throughout the state for broadcast transmitters. In this configuration the local CIO's would receive the video and respond over the audio teleconference network. But even this option would require that the transmission from Helena would be beamed to the commercial broadcast stations in Montana through a satellite transponder, if one is available for lease. This option would also require Montana television stations to sell air time on an infrequent, and perhaps, random, basis.

An interesting aside is that people using both audio teleconferencing and video teleconferencing prefer, for the most part, audio teleconferencing over video links. (Personal information gained by the author after two years experience in the Alaska Legislative Information Network, which uses both audio and video

teleconferencing modes.) In this age of massive television exposure one tends to forget how rich and varied the human voice is in conveying ideas, thoughts and impressions regarding any subject. It is also noted that the public adapts very well to audio telecommunications but not to video telecommunications: simply too much emotional energy is vested into sitting in front of a camera, if, and it is a big if, you can get the general public to sit in front of a camera. For the high profile public servant this is a necessary and learned adaption, for the general public it is not.

Considering how cost effective and useful audio and data telecommunications are it is best to restrict video communications for public use at the present time. It is the authors opinion, with the exception of one way real-time video for use by high profile public officials, that two way real-time video is not necessary to communicate todays concerns as related through the Montana Information Network.

As developed in this report the Teleconference Centers and Community Information Offices offer 27 audio teleconferencing entry points and eleven data entry points for the geneal public: models one and two provide a high degree of public access for information gathering and communication.

MANAGEMENT CONSIDERATION

The Montana Information Network is a decentralized telecommunications network utilizing audio and data links and video tapes for information retrival and communication. For the MIN as a whole interaction with the general public will be higher than in many other agencies or companies and this will bring about the need for management policies that reflect both the speed of information transmittal and the evolving need to accept and promote management decisions not made in a single location. The use of the work evolving is deliberate: as more and more people gain information that is applicable to their needs, and the means to convey their thoughts and concerns about decisions and actions that reflect their needs, the more people will be involved in decisions that affect them directly. As mentioned earlier, this will demand that the network (already decentralized by technology) will become increasingly distributed, that is various decision making functions carried out in one central location will now be shared with the modes of the network and the people taking part in network activities. For government and non-profit organizations this managerial distribution seems particularly well suited.

The same goals of traditional, centralized management (economy of scale, coordination or interdependent activities and a balance of lower level goals against higher level goals) remain the same but the methodology used to implement managerial prerogative is now shared, or distributed. The short of this is that traditional management must adapt to decentralization. In the early use of telecommunications this necessary adaptation was not realized and/or not appreciated. This has led in the past to considerable heartache on the part of many agencies and companies. It is the goal of management to grow with the telecommunications system they deploy.

The management staff in Helena will consist of five people:

Director

Programmer

Teleconference Coordinator

Moderator

Secretary

Other staff members will be (for each of the eleven CIO's):

Information Officer

Assistant Information Officer

The sixteen Teleconference Centers will each be staffed with permanent, part-time positions entiled:

Moderator

The salary range is suggested to fall between steps 12 and steps 18. In all 43 people will be employed to bring an effective telecommunications network easily accessable to 75 percent of the people of Montana.

The director is responsible for overall coordination of the Helena staff, the Community Information Offices and the Teleconference Centers. This includes recruitment and training, scheduling and planning for future needs and systems flexibility. However, a major duty of the Director is liaison with both the executive and legislative branches of government as well as the general public. The Director must have experience with audio and data telecommunications, office management and the general public. Strong public speaking and good writing skills are demanded. It is suggested that some sizable portion of his or her background be in hard sciences and that he or she be well read in diverse areas, say from the arts to anthropology to physics. In short, this individual is going to be unique, perhaps with an unorthodox background and with a considerate but independent frame of mind.

The Programmer will be responsible for computer operations, computer terminal training and building a data base for information requests and retrival for the Montana Information Network. He or she will be responible for the data telecommunication coordination throughout the network.

The Teleconference Coordinator will be responsible for audio teleconference operations and the training of all moderators, both the Information Officers in their role as moderator as well as the Teleconference Center moderators. This will include teleconference scheduling on a routine basis. The teleconference coordinator will, at times, moderate Helena teleconferences.

The moderator in Helena will share similiar duties to his or her counterparts in the rural Teleconference Centers, primary responsibility will be the setting up of teleconference equipment in various Helena locations, signing in of teleconference participants, distribution of documents, assist the conference chairman as needed and the tearing down of equipment. The moderator works under the direct supervision of the Teleconference Coordinator.

The Secretary assists the director as required.

The Helena staff assists the CIO's and TC's as required. Experience has shown that this can best be done with daily, informal audio teleconferencing for administrative purposes. The 'espirit de corps' that is generated from unstructured conversations can rival the best team effort in any organization.

TRAINING AND FAMILIARIZATION

Training refers to staff training and familiarization refers to the user, that is government and the general public. Staff training is an ongoing process that begins with a formal training period, generally two to three days in Helena and is provided by the Helena staff. User familiarization is more diverse and is carried out through the media (press, radio, TV), public speaking and open-house in the Community Information Office. User familiarization is also on ongoing process.

The director in Helena will be the principal user liaison in the greater Helena area and the Information Officer will do likewise in their area of operations as well as the area of operation for the Teleconference Center(s) nearest their CIO sites. In this configuration the TC moderators will not introduce audio and facsimile telecommunication capabilities to their local public. The director will assist the Information Officers in many of their public speaking rolls, especially during the first year of operations.

In the appendices of this report are two documents that cover in some detail data terminal training (A Training Manual for Community Information Officers) and audio teleconferencing moderating (Audio Teleconferencing: Proceedures and Protocols). The manuals are performance oriented, that is the audio and/or

data telecommmunications operator works on the same machines to perform the functions being learned and the training continues once the Information Officer of Moderator returns to their Community Information Office of Teleconference Center.

As mentioned in Management Considerations, the Director has the overall responsibility for recruitment and training, however, the Programer in the Helena Office will train personnel in computer terminal operations and the Teleconference Co-ordinator will train audio teleconference procedures. It is interesting to note that audio and data terminal procedures are quickly learned if taught in a patient and low-keyed method.

Other areas, not covered in the two areas mentioned above, such as Management Information Systems, Office Automation, will be developed. Public Service Announcements, both audio and video, should be developed for media distribution as well as newspaper articles. A logo design, for letterhead and poster use, will establish a link between the general public and the Montana Information Network. The initial user introduction to telecommunications will take about a year with follow-ups through the second to, perhaps, fifth years following system development.

COSTS ANALYSIS

Some of this requirement phase is straight forwarded: line charges, data terminal equipment costs, computation of suggested job grades, etc. . . while other areas, most notably estimates of teleconference hours per month and out-of-state data base use are indeed subjective on the part of the author. However, this subjectivity is based on two years of experience as a teleconference moderator and Information Officer for the Alaska legislature. It is interesting that demographic similarities (distribution of population, seasonal lifestyles, a "western" attitude) exist between Alaska and Montana. The costs analysis that follows is formed from experience, both technical and managerial, to give the most realistic estimates possible.

Costs comparisons are based on fiscal year 1980 in-state travel expenditures for Montana government officials. In this regards the analysis considers only the first phase in the evolution of a telecommunications systems deployment: the savings in routine travel time and costs. This limit-comparison does not take into account increased productivity, with the exception of time and monies saved as mentioned above, resulting from increased dialogue and increased awareness for both government employees and the general public.

There is, at this time, no real method to measure the increase in public productivity resulting from eleven data entry and retrival points (the Community Information Offices) useful for any number of private/public/economical concerns. Still, the savings resulting from state employee use is considerable and should more than pay for the cost of such a telecommunication system deployment and offer a reduction in government costs realized at the end of the first year of use.

In fiscal year 1980 the state of Montana spent $10,342,500 in in-state travel. Expenses for personal car and state motor pool cars totaled $3,280,000 with more than 16,400,000 miles traveled. This is equivalent to 159 work-years or (estimating $15,000 per year salary) $2,385,000 in salary for travel time in addition to the ten million dollar figure noted above. In contrast the first year deployment costs for eleven Community Information Offices and sixteen Teleconference Centers is estimated at $1,445,500. This includes $437,500 for one time purchases of furnishings and audio/data/video electronic equipment. It is the contention of this report that end of first years savings, following telecommunications systems deployment, for state government agencies alone would be $3,413,000 in travel costs and $787,000 in salary costs. This is a one-thirds savings in state tax dollars used for travel costs. The approximate net dollar savings figure is $2,754,500 (.33 x (total travel plus salary) - cost of M.I.N.).

Depending upon the needs of state agencies and management practices use of a telecommunications sytem with audio, video tape and data interface could save from between 30 to 80 percent of all state travel costs. A savings at the end of first year deployment should be 30 percent at a minimum.

A teleconference arranged by common carrier (the Bell system) to 27 locations in Montana at an average of 300 miles apart for three hours would cost $3,369 compared to $702 using the audio teleconference network developed in this report for line charges alone.

The Montana Information Network, as developed in this paper would employee 43 people for a yearly cost of $611,000. One time purchase of audio/data/video equipment and office furnishing are set at $437,500 with line charges (state WATS, tie-line) of $59,000 for audio teleconferencing, $52,000 for out-of-state data base retrival and $116,000 for in-state data base and electronic mail use.

Your attention is directed to the following costs of line items for the CIO's, TC's and Helena office.

COSTS: Teleconferenece Center

	Month	Year
Salary, grade 12, title Moderator, based on 40 hours per month (computed with 18.5% load)	$ 474	$ 5,688
Fascimile transceiver, portable (amortized over 12 months)	208	2,500
Audio teleconference set, (can not be purchased at this time)	35	420
Video tape player, camera, monitor (color amortized over 12 months	208	2,500
Line charges, 26 hours per month at $0.15 minute (state tie-lines, WATS only)	234	2,808
Paper supplies, etc	15	180
	$1,174	$ 14,096

First years costs for one TC	$ 14,096
number of sites	x 16
Total years costs for 16 sites	$225,536

COSTS: Community Information Center

	Month	Year
Salary, grade 14, title Information Center (computer with 18.5% load)	$ 1,738	$ 20,856
Salary, grade 13, title Assistant Information Officer (computed with 18.5% load)	1,639	19,671
	$ 3,377	$ 40,527
Facsimile transceiver, portable (amortized over 12 months)	208	2,500
Audio teleconference set (can not be purchased at this time)	35	420
Video tape player, camera, monitor (color) (amortized over 12 months)	208	2,500
Computer terminal, interactive, with keyboard, CRT, two eight inch floppy disc, letter quality printer (80 character per second), software (amortized over 12 months)	1,042	12,500

Modem, asynchronous 1200 baud	100	1,200
Modem, synchronous 2400	150	1,800
Telephone, "Touch-O-Matic 32", with speaker phone, dial tone detector, two each	40	480
Telephone installation charge (one line [illegible])	N/A	95
Line charges, office telepphones (all modes, tie line, WATS, switched)	200	2,400
Line charges, out of state data bases for 60 five minute per month at five hours total (average $70 per hour) plus five hours telephone charges (TYMNET, TELENET, WATS)	435	5,200
Line charges, to in state data base in Helena, 108 hours per month using state WATS, tie-line only at $0.15 per minute	972	11,664
Line charges, teleconference, 52 hours per month using state WATS, tie-line only at $0.15 per minute	468	5,616

Furnishings for CIO office	584	7,000
Mailings	100	1,200
Paper supplies, etc....	100	1,200
Office space rental plus utilities	450	5,400
Copier, 12 copies per minute on standard paper	292	3,500
	$ 8,761	$105,222

First years costs for one CIO	$ 105,222
number of sites	x 10
Total years costs for 10 sites	$ 1,052,220

COSTS: Helena Office

	Month	Year
Salary, grade 18, title Director, fulltime (computed with 18.5% load)	$ 2,370	$ 28,440
Salary, grade 17, title Programmer, full-time (computed with 18.5% load)	2,222	26,663

Salary, grade 16, title Teleconference Co-ordinator, fulltime (computed with 18.5% load)	2,044	24,530
Salary, grade 12, title Moderator, full time (computed with 18.5% load)	1,462	17,538
Salary, grade 12, title Secretary, full-time (computed with 18.5% load)	1,462	17,538
	$9,559	$114,709
Facsimile transceiver, portable (amortized over 12 months)	208	2,500
Facsimile transceiver, non-portable auto-dial/auto answer (amortized over 12 months)	567	6,800
Video tape player, camera and monitor (color) (amortized over 12 months)	208	2,500
Audio teleconference set, two each (can not be purchased at this time)	70	840

Computer terminal, interactive, with keyboard CRT, two eight inch floppy disc, letter-quality (80 character per second) printer, software, (amortized over 12 months)	1,042	12,500
Modem, asynchronous 1200 baud	100	1,200
Modem, synchronous 2400 baud	150	1,800
Telephone, "Touch-O-Matic 32", with speaker phone, dial tone detector, three each	120	1,440
Line charges, office telephone (all mode: tie-line, WATS, switched)	500	6,000
CPU charges, state computer for data base	500	6,000
Mailings	200	2,400
Paper supplies, etc....	200	2,400
Copier costs	100	1,200
Telephone installation charge (one time only)	N/A	143

Teleconference Multi-Port Dial Equipment	355	4,260
Teleconference Multi-Port Dial Equipment installation charge (one time only)	N/A	2,243
	$ 13,879	$167,855

APPENDIX A

Audio Teleconferencing:

Procedures & Protocols

Montana Community Information Offices

and Teleconference Centers

AUDIO TELECONFERENCING

MODERATOR PROCEDURES AND PROTOCOLS

As a teleconference moderator, your duties are many fold and must be performed with professional care. You will often be working in the presence of legislators and a varied array of government and/or local citizenry.

Most often, teleconference are public hearings and will require moderator assistance with publicity and coordination. Other teleconferences may be legislative committees holding working sessions, other agencies having policy or planning meetings, or a non-profit group gathering to discuss a special topic. Subject matter varies as do eligible users. The network is available year-around and on a priority basis to the following users:

Montana State Government Agencies

Public and Non-profit Organizations

Priorities will be worked out among the three branches of government before scheduling.

Due to the various types of teleconferences, some will not require publicity assistance, but will require calendaring and other tracking by the moderator.

AUDIO TELECONFERENCING

Scheduling

Requests for teleconferences are scheduled through the Helena Teleconference Office only. When an audio teleconference is scheduled that includes your location, the following procedure takes place:

A copy of the contact sheet is telecopied to you from Helena with all pertinent information on it. For the CIO's a notice will have been sent to you on the data terminal prior to that. A master file is kept in Helena.

Make a file for this contact sheet, to which you may add updates and documentation later.

Mark your calendar showing date, subject and time.

Proceed with special publicity and/or local contact instructions, as indicated on your contact sheets.

Make posters and post when and where appropriate.

Following the scheduling process, you will be advised by Helena of updates, cancellations, pre-emptions and other information - either by CRT, telecopy or the audio teleconference network (hereafter referred to as the ATN).

If a teleconference request is made through any office other than Helena, encourage the requestor to call Helena direct. However, you may forward requests to Helena via the ATN or data terminals. Be sure to include all the pertinent information.

Publicity

Copies of the Public Service Announcement Directory should be in your office as an aid to local ATN users. This directory is provided to assist and encourage ATN users to fully utilize the media in publicizing public hearings.

You may be asked to make some local telephone calls to special participants and/or media sources.

You will be provided with copy of any related news releases or public service announcement prior to the scheduled teleconference. Users will be asked to write

and distribute their own PSAS and news releases, however, we will assist with PSA distribution in those communities where it is timely and practical.

If the scheduled teleconference is a public hearing, post a copy of the news release or PSA in your office, on a window, a door, bulletin board or wherever public can best view notices. On the day of the hearing, be sure to post a notice with the title, "Today's Hearing," on your window or door too. Also, if you have a reception area or table for public access in your office, utilize this to place copies of notices, publications, ATN schedules and the "Teleconference Site Directory."

Beyond specifics noted above, use your own initiative and talent in representing the ATN in your community. Use your own good judgment and discretion in making teleconference information as available to your community as possible. For example, some sites distribute a weekly teleconference schedule in their communities, either by mail, newspaper or posting copies.

Equipment

Teleconference equipment in your office or center

should include a conference set with green and gold mikes as separate attachments. To avoid room noise and other interruptions during teleconferences, it is best to leave mikes off when in "listening" mode, that is, at all times other than when mike is being used.

The ATN circuit is owned and maintained by Mountain Bell. It terminates into telephone company facilities in the various ATN communities, and it is your local telephone man who maintains and repairs the cable and modular jacks in your office.

Calling another site: Standard procedure is to turn on your conference set each morning, or when you come into your ATN center, and stay on the network throughout the day. However, the 931 hotline allows us to leave conference sets off when desirable, in order to be actually called, as with your standard telephone.

Privacy: With special equipment in the Helena teleconference manager's offices, "Privacy" may be implemented. Only those sites specified for a given teleconference will be on the circuit, with all others excluded. This can be controlled by Helena only.

Off-Net Dialing: This feature enables communities that are not part of the dedicated circuit to be included in a teleconference. Only Helena can access special codes that enable them to literally dial a distant telephone number and include it in a teleconference. These calls may be dialed from Helena.

Other equipment used in association with the ATN is the telecopier and video tape player. The telecopier is used for document exchange, schedules and various written materials that are pertinent to your teleconference purposes. The video tape player will be used prior to the teleconference, or occasionally during the conference, and will be included on the schedule.

More detailed and specific equipment instruction is available through the ATN Coordinator. Essentially, all procedures are simple and moderators need not have great technical knowledge to operate the apparatus.

In addition to your teleconference equipment, Community Information Offices are equipped with a computer terminal for data base collection, inter-office mail and office automation.

If you have problems with any of your equipment, or it fails, report to the ATN Coordinator at once. Do not call the local telephone company.

Teleconference Procedure

Prior to the day of the scheduled teleconference, check with the Helena office to be sure you have the proper documentation, and other backup materials on hand for your participation. Be sure to review materials so you can answer basic questions from the public about the teleconference.

Then, on the day of the scheduled teleconference....

Prepare your room for participants, setting up equipment, chairs and tables in a meeting-like atmosphere.

Set aside a place (near the door) where participants can sign-in and pickup any materials relating to conference subject. Also, have on hand evaluation sheets and the "Teleconference Procedure" sheets.

Review your file on the teleconference so that you are fully aware of subject matter, sites, participants, the chairman, etc. Make some follow up calls in your

community if you deem appropriate, particularly if teleconference is a non-publicized "work session..."

Equipment should be set-up and mikes tested 15 minutes prior to start of the teleconference. Set aside other office duties so you can concentrate on greeting participants and answering their queries.

Prior to the meeting, after the participants have gathered, acquaint those who will be using mikes with their operation.

If the meeting is being chaired from your site, you are designated as the "Primary Moderator" and will give premeeting "warm-up" to all sites briefly familiarizing participants with the ATN procedure. You will also greet the chairman, review the meeting plan, and assist with any needs he or she may have prior to and during the teleconference. (This might include telecopying some last-minute documentation.) Be sure you and your equipment are situated close to the chairman's position at the table.

Primary Moderator Responsibilities

As the primary moderator, you are critical in setting the "mood" of the teleconference.

Be sure you have discussed with the chairman how he/she wants to handle the teleconference. For example, will the chairman poll the sites or will the Primary Moderator? Is the teleconference to be formal or informal? Listeners can tell if you are bored or flustered by your voice.

Pre-Teleconference. On the day of the teleconference, confirm with the chairman the time, location, video tapes to be used, and any special instructions, such as limits on testimony, etc.

Polling should begin 5 minutes prior to the teleconference. At this time you should check to make sure all microphones are working as well as update the sites on any new information you have. Confirm which sites will be participating and the number of witnesses at each site. Approximately 1-2 minutes before the teleconference, give a warm-up spiel verifying the user, subject, sites included and any special instructions.

During the Teleonconference, you are responsible for all the usual moderator responsibilities in addition to the following:

- Be sure to closely monitor audio quality from all sites.
- Make sure your "warm-up" spiel asks everyone to initially identify themselves.
- If testimony is being taken, keep track of who has testified from where. Try to make sure that no sites have to wait too long before being polled.

Post Teleconference. Be sure to note how long the teleconference lasts and which sites were included in the teleconference. Send the information to Helena Teleconference Manager.

The chairman controls the meeting format, dialogue and content. The primary moderator assists with equipment, materials and such things as monitoring time, and in particular, acts as an extension to the chairman by recognizing those witnesses who wish to speak. A typical format followed at committee hearing may go like this:

..... Following the introductory remarks upon opening the meeting, the chairman will poll the teleconference sites. Polling will follow a sequence chosen at the chairman's discretion and which may not always be known by the moderators. It may take the following form.....

A) The chairman will greet the first teleconference site with whom he chooses to speak and ask the

moderator to confirm his information regarding number of participants and observers present. If video tapes were used that will be verified.

B) The chairman will then instruct the moderator to ask the first witness to take a seat before the witness microphone and introduce himself.

C) The chairman will acknowledge the witness and ask him or her to proceed; or, if such is the nature of the testimony, he will recognize committee members wishing to question the witness.

D) When the witness's testimony has concluded, the chairman will thank him or her and instruct the moderator to ask the next witness to come forward.

E) When all testimony has completed, or all time elapsed, the chairman will thank the participants and poll the next site.

Things to remember during the teleconference.....

A) Monitor your speaker's use of the microphones.

Watch for closeness to mike, head movements, project of voice. If necessary, adjust the position of the mike. Sometimes it's necessary to replace a mike. Maintain speaker's awareness to mike through eye contact and mike adjustments if necessary.

B) Monitor the incoming volume and adjust to maintain equal level. Anticipate the next site to speak and be prepared to adjust upward or downward before the first few words are lost or before listeners are blasted out of a peaceful reverie.

C) Watch for newcomers and give them participation sheets, procedure sheets and answer questions. If there is a support person, he or she will be responsible for that, but frequently you are on your own.

D) Watch the rear of the room to be sure all can hear.

E) When you are called upon, be sure to respond rather than <u>leave the network silent</u>. For example, if the chairman calls your next witness, although you

can see he or she is approaching the microphone, the chairman can't and hears only dead silence. Merely respond that "Ms. Smith is now approaching the mike."

F) If it turns out that you have a witness that speaks at great length, it's nice to have the the green mike on the mike stand available for his or her use. It's o.k. to switch mikes during the teleconference.

G) If you are having difficulty in hearing a witness, do not hesitate to interrupt. Let primary moderator know! If there seems to be consistent problems with audio levels, send a CRT marked "urgent" to Helena teleconference.

At the close of the teleconference meeting, be sure all participants have signed-in. If possible, review the meeting with the chairman and make notes where appropriate. Gather evaluation forms, sign-in sheets, notes, etc., and send originals of all to Helena; return video tapes. Copies may be kept in your file. In addition, if you have gathered local news articles or any other materials prior to the conference, mail these to Helena also. The ATN Staff then submits this information from all sites to the committee chairman.

Teleconference Forms

Forms are mentioned above; the following is the total list of all teleconference-related forms you should keep on hand in your office. When your supply runs low, contact the Helena office for more.

- Contact Sheet
- Sign-in Sheet
- Evaluation Form
- Teleconference Procedure Sheet

Other Documents For Your Use

- Public Service Announcement Directory
- Primary Moderator Warm-up Sample
- Teleconference Site Directory

APPENDIX B

USER AUDIO TELECONFERENCE HANDOUTS

MONTANA INFORMATION NETWORK

TELECONFERENCE PROCEDURES

Participating in a teleconference is a relatively simple procedure, with only a few basic rules and protocols required for effective participation. Please note the following:

HAVE YOU SIGNED-IN? Witnesses and observers should complete sign-in sheets.

TO BEGIN A TELECONFERENCE Prior to the beginning of the telemeeting, the Primary Teleconference Moderator will poll each of the participating sites and share pertinent information. The teleconference is then turned over to the meeting/hearing chairman, who calls the teleconference to order and proceeds with his or her agenda (which has previously been copied to each site).

ORDER OF APPEARANCE The Chairman will announce the order of witness participation, and call upon each site when appropriate.

TIME LIMITS The Chairman may request that testimony be limited to a certain length of time; it is important to participate within such constraints.

PROCEDURE When you are called upon to testify, take a chair at the nearest microphone, or, if you are already seated at the table, set the nearest mike in front of you. The Moderator will already have given instructions on the operation of the microphones.

Speak directly into the mike from a distance of about six inches.

Before beginning your testimony, state your name and who you are representing. Try to remember to identify yourself each time you speak.

Indicate to the Chairman when you have concluded your testimony.

There may be questions from the Chairman and/or other information exchange between sites. Pause briefly before responding to questions, to allow for lag in voice transmission. The system will not accomodate two simultaneous conversations.

TESTIMONY FROM OTHER SITES Testimony from other sites can be heard at all times from your teleconference center. Mikes are open here only when witnesses are testifying, but since some of the people attending are interested

in the testimony from other sites, please don't converse while other sites are "talking".

If you find it necessary to interject comment/response that is outside the planned agenda, to avoid undue interruption it is appropriate to signal or send a note to your Moderator, indicating your desire to so participate.

WRITTEN TESTIMONY Comments on bills, back-up material or other documentation on the teleconference may be sent to the Teleconference Coordinator in Helena. If the teleconference is a public hearing, written testimony/ material also may be sent to the Helena Office.

FUTURE TELECONFERENCES Teleconferences are scheduled and coordinated through the Montana Information Network in Helena.

*****TELECONFERENCES ARE NOT DIFFERENT FROM FACE-TO-FACE MEETINGS WHERE IT IS IMPORTANT TO FOLLOW THE AGENDA AND THE TOPIC. IF BACK-UP MATERIAL HAS BEEN PROVIDED PRIOR TO THE CONFERENCE, BE SURE TO FAMILIARIZE YOURSELF WITH IT, SO AS TO AVOID STRAYING FROM THE SUBJECT MATTER AND THUS CAUSING DELAY OR DETRACTING FROM THE MEETING.*****

MONTANA INFORMATION NETWORK

LEGISLATIVE CONSTITUENT MEETING

Welcome to the weekly/bi-weekly/monthly _____ delegation teleconference.

Legislators participating from District ____ are _____ _____.

To make the teleconference run smoothly, please observe the following items:

1. Print your name, address and phone number on the teleconference hearing form.

2. If you wish to join the discussion, please print your name and the name of the legislator(s) to whom you wish to speak and pass them to the moderator, who will notify you when you are to speak.

3. If there is a large number of people in attendance, it may not be possible to include everyone in the discussion each week, but we will do our best to let each person participate. You can help us by being concise and specific when it is your turn to address the legislator(s).

4. When it is your turn, use the mike provided. Hold it approximately 6 inches from your mouth speak clearly and slowly.

MONTANA INFORMATION NETWORK

AUDIO TELECONFERENCE

Please Print.
To be returned to Teleconference Moderator

PARTICIPATION FORM

NAME_____ Here to testify ___

REPRESENTING_____ Here of observe ___

_____

MAILING ADDRESS_____ Zip _____

TELEPHONE NUMBER_____

BROADCAST CONSENT: This proceeding may be broadcast live or recorded for later broadcast by radio or television stations. Please indicate your consent by signing below:

_____
(signature)

EVALUATION: Have you participated in other audio teleconferences? ____ If so, how many? _____

How did you learn about this hearing?

_____

_____

Would you have participated in this hearing if the network were not available? _____

If yes, did you use the network

_____ instead of travel

_____ instead of phone conversations

_____ instead of mailed testimony

Are you also providing written testimony? _____

DATE_____ SUBJECT_____ LOCATION_____

MONTANA INFORMATION NETWORK

Date:

Location:

Subject:

NAME	REPRESENTING	ADDRESS	PHONE	HERE TO OBSERVE	HERE TO TESTIFY

PRE-TELECONFERENCE "WARM-UP"

for Users

Good _____. This is _____ speaking from _____, our primary (chairing) site for today's teleconference with ___._____ on _____(topic).

I'd like to welcome all of you who are participating today, and reassure those of you who may be first-time users of the Network. Please be assured that it is a simple proceedure and quite similar to a long-distance conference call.

When speaking into the microphone, it is not necessary to shout, but do identify yourself each time you speak. For best quality, speak clearly and pause briefly after each statement. Face the microphone and speak at a distance of about 6 inches.

_____ will be chairing today's t/c from _____ _____ and our local moderators are available to answer any questions you may have regarding equipment of the L.T.N.

Other sites besides _____ who are participating today are _____, _____ and _____.

Chairman _____will give you further information regarding the format and order in which sites will be asked to participate. We'll pause briefly now in case any sites are having technical problems or have any last-minute arrivals.

Thank you for your cooperation. At this time, Chairman _____ will officially begin the teleconference.

PRE-TELECONFERENCE "WARM-UP"

Good _____. This is _____speaking from the Teleconference Center in _____.

I want to welcome each of you who are participating in today's teleconference with _____(committee).

If you have not participated in one of our Montana teleconferences before, please be assured it is a simple proceedure much like speaking into the telephone.

When speaking into the microphone, it is not necessary to shout, but do speak loudly and clearly and pause as you are used to doing on the Long Distance telephone.

Sit back six inches from the mike, as comfortably as you can.

_____ will be chairing today's hearing from _____, plus we have teleconference moderators at each site standing by to assist with equipment and answer questions you may have.

The other teleconference sites participating in today's hearing are:

Site	Moderator

Chairman _____ will give you further information regarding the format and order in which sites will be asked to give testimony.

We will now pause to answer any questions you may have of your local moderator, then Chairman _____ will begin the meeting.

APPENDIX C

A TRAINING MANUAL FOR COMMUNITY INFORMATION OFFICERS

Note - This training manual is for a classroom presentation and is to supplement data terminal equipment use in the classroom as well as visual aids.

INTRODUCTION

1. ABOUT THIS TRAINING MANUAL: This Training Manual for you, the Community Information Officer, concerns itself with the Theory of Operation, Equipment Operaation, Office Hardware Connections and Nomenclature and Trouble Shooting for the telecommunications equipment installed in your Community Information Offices.

2. TYPE OF TRAINING: This training is Performance Orientated, which means that you take part in your training from the beginning in an active way. This hands-on approach is the most effective way to learn technical material and yields higher comprehension during and after training than other methods, such as the lecture and handout method.

3. PLACE OF TRAINING: The first part of training begins here in Helena and will last throughout the next two days. There will be time for questions and coffee breaks. The second part of the training will take place after you return to your CIO's and is called Field Training Exercises or FTX. In this way training will take place where you will need it the most, in your offices. Good luck and enjoy.

COMPUTERS

Electronic computers have been in general usage for the past two decades but it has not been until the last five years that their usage has been expanded by the employment of telecommunications links, as in the Montana Information Network. Computers remain the brains of a system with telecommunications links operating like the nerves in the system. But how does this computer function?

Computers accept human information mechanically and convert this information into electrical energy. This electrical information is then processed internally into intelligence and delivered in a mechanical format at the request of the operator, again using mechanical means to address, or access the computer.

Yesterday the computing power that filled an entire room twice the size of a standard classroom can fit on the tip of your little finger today, not once but four times over.

There are, in general terms, two types of computers:

Microcomputers and Data Processing computers. The microcomputers are the first generation of computers. Microcomputers differ from data processing computers in the amount of information they can store and the number of computions they can do simultaneously. Microcomputers handle limited amounts of information and do only a few functions at a time. An example of a microcomputer is a hand-held personal computer or a desk top computer for a home or small business.

Data processing computers, referred to in this manual as computers, are the second generation of computers and handle very complex manipulations from very large memory banks storing a billion billion pieces of information. Computers of this size can answer hundreds of requests per second.

Microcomputers, sometimes called microprocessors, are used in communications networks. Our CIO office communications terminals are controlled by microcomputers. In this application microcomputers sort and store information for data processing computers. This front-end employment of microcomputers saves the data processing computers time and allows them to be used more efficiently. Microcomputers control the traffic in a telecommunications network.

TELECOMMUNICATION LINKS

Telecommunication links connect, essentially, one terminal to another terminal and, or one terminal to a computer. These telecommunications links use a variety of means to transmit the elctrical information that one terminal talks to another terminal or computer. A few are:

- Land lines (telephone lines)
- Radiowave transmissions
- Microwave transmissions
- Satellite transmissions

All of the above means of transmitting electrical information convey electromagnetic signals. Land lines, or standard telephone lines, send electromagnetic signals through wires and do not radiate their signal into free space. Radiowaves and satellite transmissions radiate their signal into free space. The difference between the above is the length, or frequency of the signals. The frequency can vary from a few hundred meters in length to a few centimeters in length. For reasons that are beyond the scope of this manual each of these separate means to transmit a signal offers some advantage be it convenience, economy or necessity.

Often, as in Montana, a combination of land lines, a

microwave and satellite links connect one CIO to another CIO. Two of the most common configurations are land line to microwave to land line and land line to satellite to land line. Getting a signal up to a satellite is called an up-link and getting a signal down from a satellite is called a down-link.

Land lines are used in the towns and cities of Montana to bring the so called "last mile" connection to and from the terminals in the CIO's. Connecting some cities are microwave links. These line of site links can be used to carry a signal to where it can be up-linked to a satellite. Microwave links are relayed everytime the signal must make a turn, as around the end of an island, or when the over-the-horizon angle interferes with line-of-site paths. The maximum distance possible by a single section of microwave transmission is generally less than a few hundred kilometers. Satellites, on the other hand, can cover a path 28,000 kilometers or three times the distance from New York to San Francisco. Communications satellites are in a fixed orbit, or geo-stationary orbit, 36,000 kilometers over the equator and it is this distance above the earth that gives them their range of transmission. Satellites are called birds in everyday conversations among technicians.

NETWORKS

A telecommunications network is the connection of one particular element, that is terminal or computer, to another element. Here, in describing networks, we are not so much concerned with the method to link one element to another element as the relationship of one element to another element.

There are two types of networks. Clustered and Distributed.

Two clustered networks can be linked together. One net is controlled in Helena, for example, and the other net in Billings. These two nets, both controlled by microcomputers, are up-linked via satellite, over microwave links.

The information net is centered in Helena where the large State data processing computer is located. The information net is a clustered network. Front-end employment of microprocessors are located in Missoula, Billings and Helena. As mentioned earlier this front-end employment of microcomputers enhances the operation of computers freeing them from many routine and clerical tasks, such as telecommunication

link control.

When computers, microcomputers and telecommunication links are combined into a network configuration the access cost to several users is affordable by time-sharing. In the last ten years computer costs have decreased ten percent per year. It is this telecommunication linkage that is underwriting the use, growth and development of computers. The employment of telecommunications if equivalent to the introduction of the printing press in the fifteenth century.

TERMINALS

By basic definition a terminal is any location in a network where information can enter and exit. This enter and exit ability is called a users input/output port. You may see this input/output contracted to an I/O. The other end of the line, again by basic definition, is called a computer. The length of line between the I/O port and computer may be only a few meters or several thousand kilometers.

A few of the many types of terminals in use today are:

Keyboard-printer

Keyboard-video display

Paper tape reader/punch

Card reader/punch

Line printer.

In this network the CIO's employ to of the above; they are the key-board, video display and line printer connected to the output port of the keyboard-video display.

A terminal, in addition to its I/O functions has one additional function called error checking. There are many types of error checking in use, but the most

common type of error checking is the counting of the total number of characters in the transmission. This total count is then sent to the receiver which counts the total number of characters received. If the count received does not match the count sent the message is automatically transmitted again. Part of a message can be lost by line interference. One common type of line interference is the build up and discharge of static charges. These static charges literally knock out pieces of message text.

When one terminal talks to another terminal or a computer they must be in synchronization. If the terminals are not in synchronization message texts can not be counted for error checking. This will result in the message not being received at the addressed terminal. Synchronization is often compressed to in-syn by technicians.

Now, after a look at computers, telecommunications links, networks and terminals we begin to look at some of the more interesting parts of telecommunication systems equipment. But first we will have to look at some of the electronic theory to understand how some particular pieces of equipment work and why they are necessary. This is especially true of modems.

You need to understand the basic differences between alternating current and direct current and also the difference between analog format and digital format.

Alternating current changes its direction of movement depending upon its frequency. For example, standard 120 volt house current is alternation current with a frequency of 60 cycles per second the house current completes 60 cycles, as shown below:

Direct current does not change in direction of movement, have a frequency or continuously change its amplitude (voltage), as shown below:

Why is this important? Why not just use either AC or DC and forget the other? Alternating current is

the only type of current that can be transmitted over wire or into free space. Alternating current amplitudes can be either stepped up or down in a transformer. Direct current will not pass through a transformer, and therefore cannot be transmitted any useful distance.

On the other hand electronic componets require direct current for their operation. This is especially true of solid-state devices used today.

This use of direct current in electronic components brings us into the employment of digital formats. All digital components count either a high or low direct current voltage. This high or low voltage in digital format looks like this:

As you can see the rise time for a digital format vs. an analog format is much faster. This makes it possible for digital components to make highly accurate counts of low and high DC voltage and is one of the many reasons for using a digital format over an analog format.

You can see an analog format is alternating current. Alternating current, or analog format, is used in the

transmission of signals between terminals while direct current, or digital format, is used inside the terminals.

The modem transfers information transmitted in an analog format into a digital format and from digital format into an analog format. In fact the word modem is a contraction of these two functions provided by the modem modulation and demodulation. Analog formats are modulated, that is the alternating current varies by both amplitude and frequency.

Digital formats, as noted earlier, do not vary by frequency and are demodulated. The modems are located near the telecommunications equipment in your office as direct current can not be transmitted any real distance. Each terminal or each computer must have its own modem.

Modems operate at different rates of information exchange. Different modes of transmission, that is satellite, microwave or land lines, can handle varing rates of information exchange. Just as a chain is only as strong as its weakest link. In Montana the lowest link is commercial land lines.

Land lines can carry 9600 bits-per-second, or bps. For example, information is exchanged between Helena and Missoula at 9600 bits-per-second. In your local office your terminal operates at the rate of 2400 bps or 1200 bps. This allows four 2400 (or eight 1200) channels of information to be exchanged at one time. With information held in storage, several terminals can use each channel by waiting only a few seconds at the most to transmit. Into each of your offices information can arrive at the rate of 2400 or 1200 bps. One modem, used for the intra-state net, handles 2400 bps. One 2400 bps modem goes directly into your terminal; the second modem also goes to your terminal but at 1200 baud for inter-state data base linkage.

2400 modems are required for intra-state terminals to operate. Remember, that other CIO's use the same 2400 channel for their communication terminals in the Montana Information Network and that transmission of data for any real distance between locations must be done in analog format. The connection to other communication terminals is done by way of a bridge. The bridge simply splits the 2400 channel into as many lines as needed for other terminals. The bridge may or may not be located

in your office. In splitting the communication 2400 bps channel into as many lines as necessary the bridge also maintains the voltage, or strength, of each line. This strength is maintained by passing the alternating current, or analog format, through a transformer. (Remember, direct current, or digital format, can not pass through a transformer.)

You can see that the 2400 bps modem directly feeds your information terminal. The 2400 bps modems in your office transfer information between analog and digital format for the intra-state communication terminals. The master modem sends the 2400 bps communication channel to the bridge. The bridge then addresses each terminal in analog format. The slave modem, located as each site, then operates that sites particular communications terminal.

Often technicians will speak of slave modems and master modems. Also, as the Community Information Offices may have the only information terminal (computer terminal) in rural areas, a system of slave and master modems is not necessary, only a direct feed from the 2400 bps modem is needed to access the computer terminal.

INTERFACE UNITS

The interface units used in telecommunication links regulate a number of specific line standards necessary to insure a good connection between terminals. There are twenty-five electrical characteristics that need to be maintained between terminals. In addition to providing standardized signal paths between terminals interface units allow modems of different electrical types to work in sequence.

Interface units may be deployed before or after modems. In Montana interface units are placed before modems.

CHANNELS

Channels used in telecommunications have two essential elements: Mode and Grade. A particular mode is the description of the actual path used to convey a signal from one point to another. Grade is related to the bps (bits-per-second) that can be obtained by a particular mode.

Depending upon the need today there are three types of modes used to carry information between points in a telecommunication link. There are:

Simplex

Half Duplex

Duplex

Simplex modes can transmit traffic in one direction only. Half-duplex modes can transmit in either direction, or receive in either direction, but can not receive and transmit at the same time. Duplex modes can both transmit and receive at the same time.

In each CIO there are two two wire (duplex) modes serving the office. One half-duplex mode is used for the teleconference network and is called a voice grade channel. The other half-duplex mode is used for the terminal and is called a data grade

channel. The difference between a voice grade channel and a data grade channel is one of line quality, or line speed.

A voice grade channel is inferior in its quality of transmission compared to a data grade channel. The reason is one of economics: elements of human speech can be lost with the intelligence of the message still intact. This is possible because the human mind fills in the missing parts of speech not being received in a message text. It is unnecessary, and more cost effective, for a voice grade line to transmit a higher quality of message text than is needed for the message to be understood.

Data grade channels are a different story: if one character of a message text is lost in transmission then the entire message is either lost, or transmitted again, depending upon the method of transmission used. This is particularly true of data processing computers. In some communication terminals one character may be substituted for another. This results in a garbled text; but because the total message count remains constant the message is received as a copy of the message sent. There are, in fact, five different levels of data grade channels

that yield different levels of message interity. This, coupled with other methods of line quality and transmission methods, makes it possible to select the grade that best fits a users need and budget. As a general rule data processing messages have a higher level of message integrity than some communication terminals while voice grade messages have the lowest. This should hold true to your general experience: your terminal will seldom, if ever, display a garbled text, such as "incorrect format...." and "illegal address....".

As mentioned earlier CIO uses two, two wire, half-duplex modes to link the teleconference network and data terminals. These two wire modes are switched on a scheduled or as needed basis every day. A leased line is called a dedicated circuit. When you make a phone call from your home you use a two wire , half duplex switched line. As a general rule leased lines are four wire, full duplex, leased lines that are dedicated modes. This private leased line generally yields superior results for message transmission over switched, public lines. However, in Montana switched lines for CIO needs provide a good quality line.

LANGUAGE

Computers and terminals talk to each other in words, just as people talk to each other in words, and, as words are made up of individual elements known as vowels each computer word or character, is made up of individual elements called bits. Most often eight bits make up one character, though different languages utilize characters made up of five, six....to sixteen bits. For our purposes in this manual we will talk about characters constructed from eight bits.

A character is also called a byte: therefore, one can have an eight bit byte. The zero's and one's seen in the illustration above correspond to the amplitude (or level) of voltage transmitted in a digital format. (Please refer to Fig. 1, page ____) This is the electronic language that computers and terminals use to convey information.

A baud is a unit of signaling speed. Typically it is the speed at which one character can be transmitted: the higher the baud rate the faster the speed of transmission. Generally the bit rate and baud rate do not coincide directly but are close enough

that one can use the words "bits" (or "bits per-second") and "bauds" interchangeably and be understood by data communication people. Remember, a bit is a element of information while a baud is a unit of signaling speed.

Protocol is a method for managing data links. Protocol is the manner that one terminal speaks to another terminal. Without protocol messages would interfere with each other, detection of errors would not be possible and, in general, data telecommunications would not be possible.

This "handshaking" between terminals accomplishes the following, basic tasks:

Message available for transmission

Start of message transmission

Acknowledgement or rejection of message

Detection of errors in message count

Retransmission after error detection

End of message

Modems also employ line protocol (which is one reawhy there are so many lights that blink on and off)

more elaborate than shown in the above illustration, but which utilizes the same basic format. More on this in the Performance Orientation section of this manual.

Polling is the method that several terminals use to share the common link connecting them or the common data processing computer accessing several terminals. Typically, several terminals need wait only a few seconds to access another terminal or computer. When several terminals share the same data link in series multipoint polling is used. Each terminal waits for its "window" to either send or receive a message.

In point to point configurations each terminal can access a computer directly and independently of other terminals.

In Montana telecommunication networks employ both point to point and multipoint polling depending upon the type of computers and related terminal equipment in use, the type of tasks performed and the link configuration connecting the terminals to their computers.

GENERAL TROUBLE SHOOTING

When a particular piece of equipment fails, or when all office equipment fails, certain, general trouble shooting procedures can be most effective in returning your telecom equipment to line. the largest percentage of your office problems can be solved within five minutes. All that is necessary is to follow a trouble shooting procedure that will cover the common reasons for equipment failure. Such a general trouble shooting format can also be used to describe a problem in seeking help and in site documentation for future review and reports.

One of the most common causes for equipment failure is a loss of power. When you notice that some of your telecom equipment is down, check to see if any other pieces are also down: this will give you an indication of where the power failure occured. Example: if all the telecom equipment is down, but the office lights are still on, then the loss of power is most likely in the breaker (or fuse) panel supplying power to the telecom table. Check the breaker(s) (or fuse(s)) in the office panel.

If one particular piece of equipment is down check to see that its power cord is still connected to the power source supplying the telecom table. Often, due to cleaning or rearranging, power supplies will become disconnected.

If the particular piece of equipment still remains down check the fuse, generally on the back of the equipment. Following this check all other connections. One important procedure to remember is to physically manipulate all connections in question taking care to check the tightness of screws and other pressure type locking devices. Let your hands and eyes work as a single unit. If a connection is no longer intact refer to your Nomenclature, Function and Connection Guide (N.F.C. Guide) before making any corrections.

During power surges that are noticable (the flickering of lights) secure the office power (turn off) at the breaker panel supplying the office and wait five minutes or longer before powering up again, following the last surge. As most other offices will not power down during surges check with other offices in your building for an indication of when

the surges have stopped. Surges, or high voltage transients, can increase line voltage in your office up to five thousand plus volts. Needless to say this can damage office equipment, especially telecommunication equipment. If, however, your office is protected by surge suppression devices, now or in the future, this power down procedure will not be necessary. At present such surge protection is not in your terminals or printers or other office equipment.

The other extreme in voltage is known as the "brown out". Brown outs are decreases in power. Unless your office lights dim the most likely indication will be garbled messages and/or a slowing down in the printing rate of your printers or telecopy machine. This is also the most likely time that a fuse will be blown or a breaker, in your breaker panel or power supply source at the back of the telcom table, will be opened and power will be interrupted to your equipment. Fuses and breakers were designed to protect equipment against low voltage.

Fuses and breakers will not offer protection against

high voltage transients. If you know that you are experiencing a brown out in your office secure power at once. However, garbled meassages can result for reasons other than brown outs. For this reason it is best to have a line voltage monitor in your office.

If none of the above corrects the problem, or is not the cause of the problem, and a particular piece of equipment will not function then power up and power down by throwing the on-off switch. Wait five seconds between powering down and powering up. Often this will clear the send/receive portion of the terminal. This is especially true of the Beehive terminal.

In your general trouble shooting procedures, once the mechanical sources have been checked, you are left with procedural routines or operator error. The short end of the story is that you must make sure that you are using the correct modes to access the equipment. This is the heart of the Performance Orientation sections of the training manual and will be covered in detail beginning with the following.

CONFERENCE SET

Think of your teleconference set as an oversized telephone with multiple microphones: you will be one hundred percent correct. Without exterior modifications your teleconference set, or telcon set, can accept two external microphones, and with the built-in mike, provides three mikes for teleconferencing. As a general rule one or two mikes will meet most teleconferencing needs. When necessary the reserve built-in mike can be used, but because of its lesser transmission quality only the Information Officer should use this option.

When using microphones that have a push-to-talk option their specific on/off button of the telcon set can remain closed. This will reduce the cracking noise accompaning such switching and improve the overall quality of a teleconference as the push-to-talk buttons on individual mikes operate without noise.

If microphones are physically abused they will break. They are perhaps the weakest part in the entire teleconference system, so care must be exercised. Also the small, four wire, telephone type connection is

also fragile due to exposure to foot traffic and moving chairs about the teleconference table.

Often, just before a teleconference, one site will ask another how it sounds. Generally this is a microphone test for continuity, that is to check whether or not each particular mike is working and how well it sounds.

A standard, international RST code could be used in this instance to reduce suggestive responses. RST is a contraction for:

Readability	12345
Strength	123456789
Tone	123456789

As you can see from the above a numeric code follows each particular section of the RST code: a numeric value of one is the lowest while a numeric value of five (in the readability section) or nine is the highest, or optimum value. The best signal hoped for would be reported as "I copy you five, nine, nine."

Readibility simply means how well do you understand the information being received, that is you can hear every word spoken (a five) or you can hear only half of the words being spoken (a two). Strength relates

only to how strong the signal received is: a strong, clear signal is a nine; a signal of moderate strength could be a five while a strength just barely coming in would be a one. Tone is the most subjective of the three: a nine would report a full, rich human voice; a five would be a voice clipped in the higher or lower ranges of speech and/or 'tinny'. A voice received broken and with a great amount of background noise would be a two or one. This RST code is one that has stood the test of time in communications and takes only a little experience to become accustomed to and adapt for your own use.

MODEM LIGHT INDICATORS

When the technicians in either Helena or Missoula are trouble shooting data link system failure they may contact your office and ask you to read out the modem(s) as part of their diagnostic procedures. Often this will indicate if the data lines coming into your CIO have faulted or if the problem is in the office itself.

Modem controls located on the front panel of the LSI 2400:

AL -- Analog Loopback:	allows for testing of analog format. Test indicator will be on.
DL -- Digital Loopback:	allows for testing of digital format. Test indicator will be on.
TP -- Test Pattern:	allows for internal testing of the modem. Test indicator will be on.
CALL -- Technician call:	calls technician in either Helena or Missoula in Data Processing.

Modem indicators located on the front panel of the 2400:

RST -- Request to Send:	(green) indicates that data terminal connected to modem has information to send.
CTS -- Clear to Send:	(green) indicates that that modem is ready to accept information from data terminal for transmission.
TXD -- Transmit Data:	(green) indicates that information is being sent to another terminal and/or computer.
LSD -- Line Signal Detect:	(green) indicates that modem is receiving proper line levels from telecommunication links.
RXD -- Receive Data:	(green) indicates modem is receiving data from another terminal and/or computer.
TEST -- Test:	(yellow) indicates that modem is in test mode.

ERROR -- Error:	(red) indicates a receiver error during internal (TP) test only.
RATE -- Rate:	(yellow) indicates that modem is working at 1200 bps instead of 2400 bps.
POWER -- Power:	(green) indicates that power in modem is switched on.
MSG -- Message:	(yellow) indicates that technician in either Helena or Missoula has a message for you.

Modem controls located on back of LSI 2400:

POWER ON/OFF --	Power on/off switch: switches AC power to modem on or off.
FUSE -- Fuse:	fuse holder for 120 Volt AC Slow-Blo 0.5 amp. fuse. Replace with same when necessary.

TELECOPIER

Your telecopier is a facsimile transceiver that can either send or receive a copy, on a one to one scale, of any document not thicker than a computer card. The telecopier 200 can work with a variety of other telecopiers on the market that have the same specifications, the most common of which for this Division, is the Xerox 200 telecopier.

A facsimile telecopier reads the degree of grayness in a document, or picture, being transmitted: the darker the image rotating past and electric eye the stronger the impulse then "burns off" a white covering on the page receiving the document. (Take a piece of telecopier paper, white side up, and scratch it with your finger; the harder you scratch the darker the image).

Your telecopier uses a standard telephone handset to make an acoustic coupling. This acoustic coupling modulates an analog signal (standard telephone or teleconference transmission signal) into an electrical impluse when receiving or the reverse (electrical impulse to analog format) when transmitting. As

noted above the handset can either be connected to the teleconference network or your office telephone.

The paper is loaded by lifting the drum door and aligning one edge of the paper in a metal locking device running the length of the drum. Rotate the drum at either end with your thumb: do not push on the metal drum itself. The paper is secured by closing the drum door. This procedure is the same for receiving or transmitting: in receiving the white side of the paper is face up and in sending the printed side is also face up. It is important that the paper not fold over itself on the drum or that images on the down side not show through, or else they too will be transmitted.

Check to make sure the telecopier is in either the send or receive mode and that the speed switch is in four or six. (A speed switch of four, the most common, means that the total time for a standard size paper to be copied or transmitted will be four minutes. A speed switch of six corresponds to a six minute receive or transmit time. These extra two minutes will allow for a greater fidelity of copy received, as in the sending of pictures).

The carriage position control (silver rabbit ears) must be in the extreme right to begin receiving or transmitting. To move the carriage position control squeeze together the two poles. If a transmission is not being received (no markings on the white paper) or being received poorly (solid gray on the white paper) squeeze and hold the carriage position control: an end of message tone will be sent to the transmitting set and you can then talk to the operator sending copy. Excess line noise will make your copy gray: split copy will sometimes be received because the telecopier receiving is not in sync (that is not turning in unison with) the telecopier transmitting. To correct a sync default transmit again. If line noise is a problem you may have to wait until the noise level decreases or use another transmission mode (teleconference or telephone).

To activate your telecopier for transmitting or receiving simply insert the handset. To discontinue remove the handset. You can transmit to an automatic telecopier by direct dialing on your office telephone. If the automatic telecopier is in use a busy tone will be heard. If available for copying a intermittent monotone will be heard.

An automatic telecopier can also send you several pages of telecopy. You have twenty seconds to insert a new page before the automatic telecopier will fault. When feeding new pages remove the handset (an intermittent monotone will be heard) and reinsert for consecutive copies. When your telecopier has received the last page remove the handset.

TROUBLE REPORTING

Trouble reporting and trouble shooting, can be enhanced by following a general outline (Fig. 4). When such a guide is transmitted to a particular site, or originates from a particular site, and is completed as necessary, it is called 'Format Keying'. Entries are made into format only when an item is true or positive.

A trouble report format can be entered into your terminal memory and retrieved for routine, daily telecommunication equipment reports as well as used to document and follow through on particular problems. By filling in the appropriate blanks time is saved and a standardized format is obtained for documentation and reports at later times.

IBM TERMINAL AND PRINTER

Your IBM terminal offers several programs for CIO use at the present. Before you can use any program, access to the computer linked to your terminal must be gained.

The keyboard of your IBM terminal has:

One key functions
Two key functions

That is, for some commands you need depress only one key while, for other commands, you must depress two keys at the same time. Also, several keys have two or more functions that they can be selected for by depressing the 'ALT' (alternate) key to the immediate right of the space bar. The ALT key must remain depressed while you are depressing the second key to select its other (or alternate) function. This is true of all two key functions. (Alternate functions are shown on the front side of a key.)

To gain access to the data base enter a code word in the home position of a blank video display. Simply type in the code word and depress the ENTER key. Your program format will appear offering you access to this program.

For example, we will use a legislative program called 'Basis". This is a one key function. You can select from:

Bill Identification...

Sponsor.....

Committee Name..... House ? Senate ?

Awaiting Action.....?

Other one key functions include the above. In Bill Identification type in the bill number, such as HB22 or SB77, following its title on the display and depress the ENTER key. To view which bills are in a particular committee type in the correct spelling of the committee, or its abbreviation (see single page instruction sheet) and which chamber (House or Senate) the committee is in. (Enter an X over ? mark following chamber). Note -- when moving the cursor across or down the display use an arrow marked key, not the space bar. Finally, to view which bills are before the Governor simply type in an X over ? mark following its title and depress the ENTER key.

To have a display printed depress the key in the extreme bottom left marked with a graphic symbol of

Shift keys are marked with and the shift lock

key is located just above the left shift key also graphically marked with the symbol of a pad lock.

To clear the display of any programs is a two key function: simultaneously depress ALT and CURSR SEL (cursor select) in the upper left of the keyboard. This function is especially useful when you wish to leave long programs and search for other data. The only other way to begin a new search is to work page by page through a current program being displayed. This can be time consuming.

The area across the bottom of your display set off by a solid line informs you of the status of your terminal. In the extreme left of the terminal status area are three symbols: the number six tells you that the terminal is working; the letter A informs you of which mode (Division of Public Services uses only mode A) and the solid block means that the terminal is ready to work for you at your present location.

Just to the right of the above symbol are operator codes that inform you of incorrect entries, ask you to wait, tells you that the keyboard is locked or asks for additional information. Additional entries can

not be made until this section of the status area has been cleared. To clear operator codes depress the RESET (reset) key to the left of the space bar.

Many of the terminals were designed to be used in conjunction with other terminals that do not have the ability of your terminal. In this regards your terminal would be the master, or smart, terminal for other, less expensive models. Your terminal can control seven other terminals.

To the immediate right of the operator codes section line codes will appear when the terminal is down. Information appearing in the line code section results from system failure and not terminal failure. "Zorkes" followed by a number indicate what type of link failure is occuring. Zorkes in this area of the status report can not be cleared by your terminal. Often, when a link failure is indicated this information will be duplicated in the operator section of your terminal: depress RESET to clear.

When your printer is connected this information will appear on the right of your status line with two digits indicating which port the printer is connected to: shows your printer is connected to port number one. When the printer fails a slash will

appear between the two graphic blocks. Printer failures must be cleared at the printer.

The printer is straight forward: all of its functions have been preprogramed. To operate turn the printer on at the left front (red switch) and wait for a warm up and self test period lasting thirty seconds. To the immediate right of the on/off switch the READY and CU SIGNAL (controlling unit signal, that is your terminal) will be lit when the printer is on line. If your printer is not on line the most expedient method is to power down and power up either the printer and/or the terminal. This is especially true when the terminal status shows that the printer is not working. Paper feeding is easy and does not present problems. Consult your Equipment 'Operators Guide'.

From the office layout one person can effectively control a teleconference in progress, greet people walking into the CIO and respond, simply by turning in a chair, to the telecommunications table. Of course this office layout is fairly straight forward for a CIO in a single room: what then would be the best layout in a two or three room layout?

Combine, if possible, the telecommunications table and your office desk. Ideally, this arrangement should be close to the main office entrance. As the majority of your time will be spent either at your desk or the telcommunications table this allows the most cost effective arrangement.

This brings us to the telecommunications table itself: commonly called the telcom table. The telcom table is organized around the telecopier (facsimile) as two lines, that is the standard telephone and the teleconference lines, are often used to telecopy messages. In the illustration the information/data terminal is at one end of the telcom table. This will allow two people access at the same time without being too close for working comfort. The printer can set to the rear of the table where paper feeding each printer will have less friction entering. Mo-

dems and interface units should be mounted beneath, or to the side of, the telcom table.

There are other considerations involved in the telcom table:

Each end of a single wire should be marked
Each separate piece of equipment should be marked
A block diagram showing equipment connections
Data lines separated by six inches from power lines
Power lines must not be coiled

The labeling of each line, and their relation to equipment shown in a block diagram, will make repair and equipment replacement easier and insure correct connections. To this end your Nomenclature, Function and Connection Guide will be of assistance when used with a wiring diagram.

It is also important to separate the power lines from data lines (all other lines not supplying power to the telcom table). Power lines have a magnetic field that can interfer with data transmission; however, for the relative low power levels (120 volts) encountered in CIO's a distance of six inches between data and power lines is ample. Power lines should not be coiled:

coiling of power lines (as if wrapped around a can or disk) will increase the magnetic field and interfer with data transmission. When power lines must be shortened they should be gathered from the center and folded back over each other for the amount to be shortened. This will cancel any magnetic field. Be sure to tie the shortened amount securely. Data lines should be shortened in the same manner.

APPENDIX D

DATA TELECOMMUNICATIONS GLOSSARY

GLOSSARY

1. Acoustic Coupling: Connection of analog signal via standard handset for transmission over switched or leased lines.

2. Amplitude: Term referring to strength or levels in electronics.

3. Analog: Continuously variable transmission of signals; varies in direction, amplitude and frequency.

4. Alternating Current: Electrical current that flows in one direction and then in another; varies in amplitude.

5. Baud: Unit of signalling speed in date transmissions.

6. Bird: Nickname for satellite.

7. Bits: A single unit of information. Several bits constitute a byte.

8. Breaker (Panel): A thermal fuse that opens (stops) the flow, of current when its maximum limit, measured in Amps, is exceeded.

9. Bridge: A port sharing electronic device: may also maintain proper signal levels.

10. Brown Outs: Periods of decreased voltage below normal levels.

11. Bytes: A binary character. Composed of bits.

12. CPU: Contraction of Computer Processing Unit or Central Processing Unit.

13. Channel: A transmission path in telecommunications; composed of a mode and grade. Also called a line or link.

14. Character: See bytes.

15. Closed: A circuit in which electrons (current) flows.

16. Communications Terminal: A terminal sharing information with another terminal not processed by a data program.

17. Computers: Common term for second generation of computers. Accepts, manipulates and reports data, or information, according to a program. Handles complex computations.

18. Cursor: Indicates where next character entry will be made on a video screen.

19. Cycles-per-second: See Frequency.

20. Demodulation: Limiting a signal to changes in amplitude only. (see modulation)

21. Digital: Transmission of signal that varies only in amplitude.

22. Direct current: Electrical current that varies any in amplitude.

23. Down link: Information transmitted from a satellite.

24. Duplex: Allows for simultaneously transmissions and reception of a signal.

25. Facsimile: Electronic duplication, on a one to one basis, of transmitted information.

26. Format Keying: Completing a transmitted form that seeks information from the terminal to which addressed.

27. Frequency: The number of cycles-per-second of alternating current passing a single reference point.

28. Grade: The quality of transmission levels in a signal.

29. Half-duplex: Allows for transmission or reception of a signal.

30. Hardware: The physical equipment that composes a telecommunications network; that is, computers, terminals, modems, printers, etc..

31. Hertz: The name given to cycles-per-second in transmitted electromagnetic signals; named after German scientist who discovered frequency properties.

Glossary cont.

32. Information Terminal: Data communications equipment accessing (having input and output) to a CPU.

33. Interface: Provides for stabilization of signals in telecommunication links; maintains line levels.

34. Land Line: Nickname for standard telephone lines. Also called twisted pair.

35. Leased Line: A private line. A telecommunications line permanently closed between specific points on a continuous basis. Does not go through a switchboard.

36. Microcomputers: First generation of computers: handles routine computations of limited scope.

37. Microprocessor: See Microcomputers.

38. Microwave: A common term used for line of sight communications. Employs a super high frequency. higher than commercial television transmissions.

39. Mode: Describes the type of path used to convey a signal: that is duplex, half-duplex, or simplex etc.

40. Modem: Contraction for modulation/demodulation. Data telecommunications equipment performing modulation/demodulation of transmitted signals.

41. Modulated: Alternation of a signal by amplitude, frequency or direction.

42. Noise: Unwanted signals on a channel.

43. Open Circuit: A circuit in which electrons (current) does not flow.

44. Polling: Sequential contact of several terminals in a network.

45. Port: Name for connection of input/output signals to computers and terminals.

46. Protocol: A procedure employed between computers and terminals for exchanging information.

47. Simplex: One way transmission of a signal; either receives or transmits only.

48. Software: Name for computer programs.

49. Surges: See Transients.

50. Switched Line: A public line. A telecommunications line connected to another telecommunications line via a switchboard.

51. Telecommunications Links: See Channel.

52. Transients: Another name for short periods of high voltage surges in commercial power supplies.

53. Transponder: Retransmits information received without altering signal frequency or information content.

54. Up-Link: Information transmitted to a satellite.

55. Voltage: Electrical pressure causing electrons (current) to flow.

APPENDIX E

SAMPLE NOMENCLATURE, FUNCTION AND CONNECTION GUIDE FOR INFORMATION OFFICERS

ITEM-------MODEM - A CONTRACTION OF MODULATION AND DEMODULATION

FUNCTION---TRANSFERS LINE INFORMATION FROM AN ALTERNATING CURRENT AND ANALOG FORMAT INTO A TWO LEVEL DIRECT CURRENT FOR INFORMATION RECEIVED AND THE OPPOSITE FOR INFORMATION TRANSMITTED.

CONNECTIONS--(a) MODEM TO DESIGNATED FOUR LINE CIRCUIT VIA A STANDARD, FOUR WIRE TELEPHONE LINE

(b) MODEM TO VIDEO DESIGNATED TERMINAL VIA A SINGLE, FLAT OR ROUND MULTI-PIN CABLE

(c) MODEM TO 115 A.C. POWER OUTLET VIA A SINGLE, ROUND THREE WIRE POWER CORD

BRAND NAME---PARADYNE

MODEL NO.----LSI 24 OR LSI 48

SERIAL NO.---_____

STATE I.D.---_____

REFERENCE----INSTALLATION, OPERATION AND MAINTENANCE MANUAL FOR THE LSI 2400 HIGH SPEED MODEM - MAINTENANCE MANUAL FOR THE LSI 48 NOT AVAILABLE. (POWER REQUIREMENTS: 115 VOLTS A.C., 60 HZS, 0.5 AMPS)

ITEM----------INFORMATION PRINTER

FUNCTION------PRINT-OUT INFORMATION RECEIVED/TRANSMITTED FROM THE VIDEO INFORMATION TERMINAL

CONNECTIONS---(a) INFORMATION PRINTER TO VIDEO INFORMATION TERMINAL VIA A SINGLE, ROUND CABLE

(b) INFORMATION PRINTER TO 115 A.C. POWER OUTLET VIA A SINGLE, ROUND THREE WIRE POWER CORD

BRAND NAME----IBM

MODEL NO.-----3287-2

SERIAL NO.----_____

STATE I.D.----_____

REFERENCE-----OPERATOR'S GUIDE FOR MODEL 3287 PRINTER (POWER REQUIREMENTS: 115 VOLTS A.C., 60 HZS, 1.8 AMPS)

ITEM----------VIDEO DATA/COMMUNICATION TERMINAL

FUNCTION------(a) RECEIVES PRINTED INFORMATION FROM COMPUTER PROCESSING UNITS AND DISPLAYS SUCH INFORMATION ON THE TERMINAL'S VIDEO SCREEN

(b) TRANSMITS PRINTED INFORMATION TO COMPUTER PROCESSING UNITS AND DISPLAYS SUCH TRANSMITTED INFORMATION ON THE VIDEO SCREEN

CONNECTIONS---(a) VIDEO INFORMATION TERMINAL TO PARADYNE LSI 48 MODEM VIA A SINGLE, ROUND MULTI-PIN CABLE

(b) VIDEO INFORMATION TERMINAL TO INFORMATION PRINTER VIA A SINGLE, ROUND CABLE

(c) VIDEO INFORMATION TERMINAL TO 115 A.C. POWER OUTLET VIA A SINGLE ROUND, THREE WIRE POWER CORD

KEYBOARD-----(a) SELECTS THE MODE IN WHICH INFORMATION IS RECEIVED

(b) ENTERS TYPED INFORMATION INTO THE VIDEO INFORMATION TERMINAL AND SELECTS SEVERAL TERMINAL FUNCTIONS

BRAND NAME---IBM

MODEL NO.----3276-4

SERIAL NO.---_____

STATE I.D.---_____

REFERENCE----OPERATOR'S GUIDE BY DALE GRIGGS, DEPUTY DIRECTOR
DIVISION OF DATA PROCESSING
DEPARTMENT OF ADMINISTRATION
DATED 25 JULY 79

(POWER REQUIREMENTS: 115 VOLTS A.C., HZS, 1.0 AMPS)

ITEM----------TELECOPIER

FUNCTION------(a) RECEIVES PRINTED INFORMATION AS FACSIMILE REPRODUCTION OF ORIGINAL DOCUMENT

(b) TRANSMITS PRINTED INFORMATION AS FACSIMILE REPRODUCTION OF ORIGINAL DOCUMENT

CONNECTIONS--(a) TELECOPIER TO STANDARD TELEPHONE LINE OR LEGISLATIVE TELECONFERENCE NETWORK VIA ACOUSTICAL COUPLING USING STANDARD TELEPHONE COMPANY HANDSET FOR BOTH TRANSMITTING AND RECEIVING

(b) TELECOPIER TO 115 A.C. POWER OUTLET VIA A SINGLE, ROUND THREE WIRE POWER CORD

BRAND NAME---XEROX

MODEL NO.----400

SERIAL NO.---_____

STATE I.D.---_____

REFERENCE----400 TELECOPIER OPERATOR'S MANUAL BY XEROX

(POWER REQUIREMENTS: 115 VOLTS A.C., 60 HZS, 0.5 AMPS)

APPENDIX F

A SAMPLE LISTING OF AVAILABLE DATA BASES

ABI/INFORM: The ABI/INFORM database is designed to meet the information needs of executives and covers all phases of business management and administration.

ADSEARCH: Indexes all advertisements of $\frac{1}{4}$ page size or larger appearing in 148 major U.S. consumer magazines.

AIM/ARM: Is a specialized index for locating materials on vocational and technical education as well as the related areas of manpower economics and development, employment, job training and vocational guidance.

AMERICA: HISTORY AND LIFE: Covering the full range of U.S. and Canadian history, area studies, and current affairs, is a comprehensive and current aid to bibliographic research.

APTIC: Covers the field of air pollution in the broedest sense, including the social, political, legal and administrative aspects of the field.

AQUACULTURE: Provides access to information on the growing of marine, brackish, and freshwater organisms.

AUQUALINE: Provides access to information on every aspect of water, waste water, and the aquatic environment. Coverage includes water resources development, and management, drinking water quality, water treatment, sewage systems, sludge disposal, groundwater polution, river management, tidal waters, quality monitoring, environmental protection.

ARTBIBLIOGRAPHIES MODERN: Contains references to all modern art and design literature in books, dissertations, exhibition catalogs, and some 300 periodicals.

ASFA: AQUATIC SCIENCES AND FISHERIES ABSTRACTS is a comprehensive database on life sciences of the seas and inland waters as well as related legal, political and social topics.

ACCOUNTANTS: Provides access to the literature related to accounting, auditing, taxation, data processing, investments, financial management, financial reporting and related legal information.

AGRICOLA: Covers worldwide journal and monographic literature and U.S. government reports on agriculture and related subjects.

APILIT: Covers worldwide refining literature, including petroleum refining, petro-chemicals, air and water conservation, transportation and storage and petroleum substitutes.

APIPAT: Contains citations to petroleum refining patents from the U.S. and eight other countries: Belgium, Canada, France, Germany, Great Britain, Holland, Japan and South Africa.

ASI: The American Statistics Index covers statistical publications of the U.S. government: periodicals, annuals, biennials, surveys, analytical reports, statistical compilations, continuing serials, and special publications.

BANKER: Covers all articles and news items appearing in the American Banker, which is published five times weekly.

BIOCODES: Is used to determine BIOSIS codes, and is helpful for determining terminology for any life science search.

BIOSIS/BIO7479/BIO6973: Covers the entire life sciences.

BHRA FLUID ENGINEERING: Provides indexing and abstracting of world-wide information on all aspects of fluid engineering, including theoretical research as well as the latest technology and applications.

BIOGRAPHY MASTER INDEX: Serves as a master index to biographical information found in more than 600 source publications, including English language general and geographical Who's Who type publication major biographical dictionaries, handbooks of authors, and biographical directories.

BOOK REVIEW INDEX: is a reference guide to locate the source of published reviews of books and periodical titles.

CHEMNAME: Contains a listing of chemical substances in a dictionary-type, nonbibliographic file.

CHEMSEARCH: Includes all new chemical substances cited in the latest six issues of Chemical Abstracts.

CHEMSIS: Is a dictionary, non-bibliographic file containing those chemical substances cited once during a Collective Index Period of Chemical Abstracts.

CHILD ABUSE AND NEGLECT: Contains over 10,000 records of three sorts: ongoing research project descriptions, bibliographic references, and service program listings.

CLAIMS/CHEM: Database contains over 265,000 U.S. chemical and chemically related patents issued from 1950 - 1970.

CLAIMS/CITATION: Is designed to answer the question of which patents cite another patent. Includes all patent numbers cited in U.S. patents from 1947 to 1979.

CLAIMS/CLASS: Is a classification code and title dictionary for all classes and selected subclasses of the U.S. Patent Classification System.

CLAIMS/U.S. PATENTS: Database contains all patents listed in the general, chemical, electrical, and mechanical sections of the Official Gazette of the U.S. Patent Office.

CLAIMS/U.S. PATENT ABSTRACTS: Contains citations and abstracts for all patents classified by the U.S. Patent Office in the areas of aeronautical engineering, agricultural engineering, chemical engineering, chemistry, civil engineering, electrical and electronics engineering, electomagnetic technology, mechanical engineering, nuclear science, and general science and technology.

CLAIMS/U.S. PATENTS ABSTRACTS WEEKLY: Includes the most current weekly update and records from the current month.

CLAIMS/UNITERM: Gives access to chemical and chemically related patents. It has the special feature of subject indexing for each chemical patent from a controlled vocabulary designed to facilitate retrieval of chemical structures and polymers.

COMPENDEX: Is the machine-readable version of The Engineering Index, which provides abstracted information from the world's significant engineering and technological literature.

COMPREHENSIVE DISSERTATION INDEX: Is a definitive subject, title and author guide to virtually every American dissertation accepted at an accredited institution since 1861, when academic doctoral degrees were first granted in the United States.

CONFERENCE PAPERS INDEX: Provides access to records of more than 100,000 scientific and technical papers presented at over 1,000 major regional, national, and international meetings each year.

CONGRESSIONAL RECORD ABSTRACTS: This database provides comprehensive abstracts covering each issue of the Congressional Record, the official journal of the proceedings of the U.S. Congress.

CRIS/USDA: The projects described in CRIS cover current research in agriculture and related sciences, sponsored or conducted by USDA research agencies, state agricultural experiment stations, state forestry schools, and other cooperating state institutions.

CAB/CAB72: A worldwide agricultural information service including areas of biology, economics, engineering, education, genetics, pest control, rural planning, and sociology, and taxonomy.

CAS77/CAS7276/CAS6771: Provides worldwide coverage of the chemical sciences literature from over 12,000 journals, patents from 26 countries, new books, conference proceedings, and government research reports.

CASSI: The Chemical Abstracts Source Index is a compilation of bibliographic and library holdings information for scientific and technical primary literature relevant to the chemical sciences.

CBPI: The Canadian Business Periodicals Index provides coverage of over 150 Canadian trade and business publications, including the Globe and Mail Report on Business, the Financial Post and the Financial Times.

CDI: Comprehensive Dissertation Index contains dissertations accepted for academic doctoral degrees granted by the U.S. and a number of non-U.S. educational institutions and universities. Subject coverage is multidisciplinary, and includes the humanities, social sciences, sciences, and engineering.

CHEMDEX/CHEMDEX2: These two chemical dictionaries are companion files to the Chemical Abstracts databases. All compounds cited in the literature from 1972 to date are contained in these files.

CHEMSDI: Covers information cited in the last six weeks of Chemical Abstracts. This file will contain detailed information about chemical compounds cited as well as the indexing parameters available in CAS77, CAS7276, and CAS6771.

CIN: Chemical Industry Notes contains citations to business literature in the chemical industry, including pharmaceutical, petroleum, paper and pulp, agriculture, and food industries.

CIS: Covers publications emanating from the work of committees and subcommittees of the U.S. Congress: hearings, committee prints, House and Senate Reports, Documents, and special publications; and Senate Executive Reports and Documents. Public Laws are added on an annual basis.

CNI: The Canadian Newspaper Index file covers 7 major Canadian newspapers. Subjects include international news, national news, provincial affairs, editorials, government activities, labor news, reviews, obituaries, and biographies.

COLD: Cold Regions database covers all disciplines dealing with Antarctica, the Antarctic Ocean, and subantarctic islands; snow, ice, and frozen ground; navigation on ice; civil engineering in cold regions, and behavior and operation of materials and equipment in cold temperatures.

COMPENDEX: Covers worldwide significant engineering literature from approximately 2,000 serials and over 900 monographic publications.

CRDS: Chemical Reactions Documentation Service, based on the monthly Journal of Synthetic Methods, provides up-to-date information on new developments in the field of synthetic organic chemistry.

CRECORD: Contains references to bills and resolutions, committee and subcommittee reports, legislation recently signed into law, schedules of committee and floor activities, executive communications, speeches, participation in debates, and inserted materials by members of Congress.

DBI: Database Index is the master index to all SDC Search Service databases. It is used as a selection tool to obtain a list of appropriate databases on a given subject.

DOANE: Corresponds to the Doane Information Center Undexing Service and covers the literature of agricultural practise, production, products and marketing.

DIALINDEX: Is a collection of file indexes for all Dialog databases. Dialindex provides the numbers of postings for each search statement in each of the databases specified. Dialindex thus indicates which file(s) would be most productive for a search statement, in addition to helping to determine how broadly or narrowly to define a search strategy statement.

DIALOG PUBLICATIONS: Is a special feature database which allows you to order Dialog publications, such as "The Guide to Dialog Searching", online.

DISCLOSURE: Provides extracts or reports filed with the U.S. Securities and Exchange Commission by publicly owned companies. These reports, filed by 11,000

companies, provide the most reliable and detailed source of public financial and administrative data on these companies.

DOE ENERGY: Includes reference journals, report literature, conference papers, books, patents, dissertations, and translations. All manner of energy topic are included.

ECONOMICS ABSTRACTS INTERNATIONAL: Provides coverage of the world's literature on markets, industries, country specific economic data, and research in the fields of economic science and management.

EIS INDUSTRIAL PLANTS: Access to the EIS Plants database offers immediate answers to a broad range of questions concerning the U.S. industrial economy.

EIS NONMANUFACTURING ESTABLISHMENTS: Provides such information as location, headquarters name, percent of industry sales, industry classification, employment size class, etc. for over 240,000 non-manufacturing establishments which employ 20 or more people.

ENCYCLOPEDIA OF ASSOCIATIONS: Provides detailed information on several thousand trade associations, professional societies, labor unions, fraternal and patriotic organizations, and other types of groups consisting of voluntary members.

ENVIRONMENTAL BIBLIOGRAPHY: Covers the field of general human ecology, atmospheric studies, energy, land resources, water resources, nutrition and health.

EXCEPTIONAL CHILD EDUCATIONAL RESOURCES: A comprehensional database concerned with published and unpublished literature on the education of handicapped and gifted children. Nore than 23,000 citations are included in the ECER database, covering such sources as books, journal articles, teaching materials and reports.

EXCERPTA MEDICA: Consists of abstracts and citations of articles from over 3,500 biomedical journals published throughout the world. It covers the entire field of medicine and related disciplines.

EBIB: Covers worldwide literature on energy from the Texas A&M Library collection. Subjects covered include but are not limited to, production, utilization, and conservation of all types of fuels.

EDB: The Energy Data Base provides comprehensive coverage of literature, patents, monographs, and technical reports concerning all aspects of energy production, utilization and conservation.

ELCOM: The Electronics & Communications database contains electronic physics, electronic systems, and applications, electric circuits, electronic devices, communications, computer software, computer applications, computer mathematics, and computer electronics from international sources.

ENERGYLINE: Over 2,000 journals, as well as reports, surveys, monographs, conference proceedings, and irregular serials, are screened to provide comprehensive coverage of energy information.

ENVIROLINE: Provides coverage of air environment environmental health, land environment, resource management, and water environment.

EPIA: Electric Power Industry Abstracts provides access to literature on electric power plants and related facilities.

ERIC: Covers report and periodical literature in education-related areas: counseling and personnel services, career education, early childhood education, educational management, exceptional children, information resources, languages, and linguistics, reading and communications, rural education, tests, measurement, and evaluation, and teacher education.

FEDEX: The Federal Index contains information on federal government activities from the Congressional Record, the Federal Register, the Weekly Compilation of Presidential Documents and the Washington Post.

FEDREG: The Federal Register includes rules, proposed rules, public law notices, meeting, hearings, and Presidential proclamations on subjects including agriculture, arts, and humanities, athletics, business, constitutional rights, consumer affairs, contracts, defense, environment, foriegn affairs, law enforcement, parks/recreation, taxation, technology, trade, transportation and veterans' affairs.

FOREST: Forest Products covers worldwide literature pertinent to the entire wood products industry, from harvesting to standing tree through marketing of the final product.

FSTA: Covers the entire field of food science and technology. Covers the literature related to all human food commodities and aspects of food processing.

FOODS ADLIBRA: Contains up-to-date information on the latest developments in food technology and packaging. All new food products introduced since 1974 are covered, and nutritional and toxicology information is also included.

FOREIGN TRADE INDEX: Designed to provide information to U.S. businesses or manufacturers by listing these firms which either import goods from the United States or state that they are interested in representing U.S. exporters.

FOUNDATION DIRECTORY: Provides descriptions of over 3500 foundations which have assets of $1 million or more or which make grants of $100,000 or more annually.

FOUNDATION GRANTS INDEX: Contains information on grants awarded by more than 400 major American philanthropic foundations, representing all records from the Foundation Grants Index section of the bi-monthly Foundation News.

FROST AND SULLIVAN DM: The DM database provides access to announcements about U.S. Government contract awards request-for-proposals, R&D sources sought, sole-source negotiations, long range planning estimates, and advanced planning procurement information for the engineered services and systems market.

GEOARCHIVE: A comprehensive geoscience database indexing more than 100,000 references each year. Information indexed annually for Geoarchive includes more than 5,000 serials, books from more than 1,000 publishers, several hundred conferences, doctoral dissertations, and technical reports.

GRANTS DATABASE: The source to more than 1500 grant programs available through government, commercial organizations, associations and private foundations.

GEOREF: The Geological Reference database covers geosciences literature from over 3,000 journals, plus books, conference proceedings, government documents, maps and theses.

GPO: The Government Printing Office file covers publications of U.S. government agencies and the U.S. Congress. Senate and House hearings on bills and laws, as well as fact sheets, maps, agency-supported studies, handbooks, bibliographies, and conference proceedings are included.

GRANTS: A complete source containing references to grant programs offered by federal, state and local government, commercial organizations, and private foundations in over 88 disciplines.

HISTORICAL ABSTRACTS: A reference service that abstracts and indexes the world's periodical literature in history and the related social sciences and humanities.

INPADOC: Provides references to approximately 16,000 patents per week from 45 countries.

INTERNATIONAL PHARMACEUTICAL ABSTRACTS: Provides information on all phases of the development and use of drugs and on professional pharmaceutical practice.

IRL LIFE SCIENCES COLLECTION: Contains abstracts of information in the fields of animal behavior, biochemistry, ecology, entomology, genetics, immunology, microbiology, toxicology, and virology among others, and corresponds to the series of 15 abstracting IRL journals.

ISMEC: Indexes significant articles in all aspects of mechanical engineering, production engineering, and engineering management from approximately 250 journals published throughout the world.

INFORM: Covers about 500 periodicals in the areas of business, management and industry.

INSPEC/INSP6976: Provides worldwide coverage of the literature in physics, electrical/electronics engineering,and computers and control.

LABORDOC: Covers worldwide journal and monographic literature in the fields of labor and labor-related areas, including industrial relations, economic and social development, managment, demography, education, law, environment, and earth sciences.

LIBCON: Provides extensive coverage of the monographic literature, serials, maps, manuscripts, and other materials cataloged by the U.S. Library of

Congress as well as Conser and National Library of Canada publications.

LISA: Provides worldwide coverage of the field of library and information science, including library history, comparative librainship, users and users' behavior, library automation, information storage, and retrieval, buildings, and equipment.

LABOR STATISTICS: Database is based on summary data generated by Bureau of Labor Statistics survey.

LANGUAGE AND LANGUAGE BEHAVIOR ABSTRACTS: Provides current selective access to the world's literature on language and language behavior as a service to all researchers and practitioners in disciplines concerned with the nature and use of language.

LEGAL RESOURCE INDEX: Provides cover-to-cover indexing of over 660 key law journals and 5 law newspapers plus legal monographs and government publications from the Library of Congress MARC database.

MAGAZINE INDEX: Covers over 370 popular magazines and provides extensive coverage of current affairs, leisure time activities, home centered arts, sports, recreation and travel, the performing arts, business, science and technology, consumer product evaluations, and other areas.

MANAGEMENT CONTENTS: Database provides current information on a variety of business and management related topics to aid individuals in business, consulting firms, educational institutions, government agencies or bureaus, and libraries in decision making and forecasting.

MEDLINE: Corresponds to three printed indexes: Index Medicus, Index to Dental Literature, and International Nursing Index. Medline covers virtually every subject in the broad field of biomedicine.

MENTAL HEALTH ABSTRACTS: Database cites worldwide information relating to the general topic area of mental health. Sources include 12,000 journals, books, monographs, technical reports, workshop and conference proceedings, and symposia.

METADEX (METALS ABSTRACTS/ALLOYS INDEX): Metals Abstracts include about 30,000 citations each year from about 1,100 primary journal sources. Alloys index supplements Metal Abstracts by providing access to the citations through commercial, numerical, and compositional alloy designations; specific metallic systems; and intermetallic compounds found within these systems.

METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS: Provides current citations in English for the most important meteorological and geoastrophysical reasearch published in worldwide literature sources. Over 200 sources, including technical journals, monographs, proceedings, reviews, and annual publications are scanned for relevant literature.

MLA BIBLIOGRAPHY: Indexes books and journal articles published on modern languages, literature and linguistics.

MANAGEMENT: Provides extensive coverage of the business and managment literature from both U.S. and non-U.S. journals, proceedings, and transactions.

MONITOR: Contains all articles and many regular columns that appear in all of the regional editions of the Christian Science Monitor.

NDEX: Is unequaled in its broad coverage of international, national, state and local news providing regional as well as national perspectives on major events, issues, personalities, etc. Ten major U.S. newspapers and eleven Black newspapers are covered.

NTIS/NTIS6469: Covers U.S. government-sponsored research and development from over 200 federal agencies. Includes technical reports, some reprints, federally sponsored translations, and foreign-language reports in areas of major technical interest.

NATIONAL FOUNDATIONS: Provides records of all 21,800 United States foundations which award grants regardless of the assets of the foundation or of the total amounts of grants it awards annually.

NATIONAL NEWSPAPER INDEX: Provides front page to back page indexing of The Christian Science Monitor, The New York Times, and The Wall Street Journal. All articles, news reports, editorials, letters to the editor, obituaries, product evaluations, biographical pieces, poetry, recipes, columns, cartoons and illustrations, and reviews are included.

NCJRS: Covers all aspects of law enforcement and criminal justice from police; courts; corrections; juvenile justice, community crime prevention; criminal justice system; fraud, waste, and abuse in government programs.

NEWSEARCH: A daily index of more than 2000 news stories, information articles and book reviews from over 1400 of the most important newspapers, magazines and periodicals.

NICEM: Database offers comprehensive coverage of non-print educational material. Nicem covers the entire spectrum of the educational field from pre-school to professional and graduate school levels.

NICSEM/NIMIS: National Instructional Materials Information System contains descriptions of media and devices for use with handicapped children.

NONFERROUS METALS ABSTRACTS: Covers all aspects of nonferrous metallurgy and technology. Sources include journals, monographs, British patents, reports, standards and conference papers.

OCEANIC ABSTRACTS: Organizes and indexes technical literature published worldwide on marine-related subjects. Over 9,000 citations from approximately 2,000 domestic and foreign sources are added to the database each year.

ONTAP CA SEARCH: To provide a low cost database containing chemical information which may be used to demonstrate Dialog chemical information system to people unfamiliar with the Dialog service.

ONTAP CHEMNAME: Chemical substance information may be retrieved in Ontap Chemname by use of the molecular formula, systematic nomenclature or synonyms, and other chemical data.

ONTAP ERIC: A programmed instruction file designed to provide an opportunity for low-cost training and practice in online searching. Ontap Eric allows the user to choose a practice search topic from 29 different questions ranging in complexity from simple to difficult.

ORBIT: Once connected to the Orbit database, the user may request online explanations, display the system news, order copies of full-text documents from any of the available services, send requests for information or documentation to the Action Desk, and perform other maintenance or housekeeping functions.

PAPERCHEM: Covers the scientific and technical literature of the pulp, paper, and board manufacturing and utilizing industries from all industrialized countries.

P/E NEWS: The Petroleum/Energy Business News Index covers twelve major publications: Energy Asia, Platts Oilgram News Service, Middle East Economic Survey, National Petroleum News, Petroleum Intelligence Weekly, Petroleum Economist, Oil Daily, Oil Gas Journal, Lundberg Letter, Petroleum Times, Oil & Energy Trends, and Petroleum News Southeast Asia.

PESTDOC/PESTDOC II: Covers worldwide literature on pesticides, herbicides, and plant protection designed specifically for the information requirements of agricultural chemical manufacturers exclusive of fertilizers.

PIE: The Pacific Islands Ecosystems database contains biological, ecological, physical and socio-economic information on the Pacific Islands.

PROMT/PREDALERT: Contains industry-specific information, including historical and projected data and reports on the state of the technology, marketing climate, consumer patterns, and the economy throughout the world.

PSYCHABS: Provides international coverage of psychology and other behavioral sciences.

PAIS INTERNATIONAL: Contains references to information in all fields of social science including political science, banking, public administation, international relations, economics, law, public policy, social welfare, sociology, education and social anthropology.

PHARMACEUTICAL NEWS INDEX: The online source of current news about pharmaceuticals, cosmetics, medical devices, and related health fields.

PHILOSOPHER'S INDEX: Provides indexing and abstracts from books and over 270 journals of philosophy and related interdisciplinary fields.

PIRA: Database is indexed and abstracted from literature published throughout the world including over 600 periodicals as well as books, pamphlets, standards, specifications, legislation, translations, conference papers, research reports, trade literature, and other information.

POLLUTION ABSTRACTS: Is a leading resource for references to environmentally related literature on pollution, its sources and its control.

POPULATION BIBLIOGRAPHY: A principal source for information on abortion, demography, migration, family planning, fertility studies, and all general areas of population research methodology.

PSYCINFO: Covers the world's literature in psychology and related disciplines in the behavioral sciences.

PTS F&S INDEXES: Covers both domestic and international company, product, and industry information. It contains information on corporate acquisitions and mergers, new products, technological developments, and sociopolitical factors.

PTS INTERNATIONAL FORECASTS: Contains abstracts of published forecasts with historical data for all countries of the world. Coverage includes general economics, all industries, detailed products, and end-use data.

PTS INTERNATIONAL STATISTICS: (See PTS International Time Series and PTS International Forecasts)

PTS INTERNATIONAL TIME SERIES: Composed of two subfiles:
Worldcasts Composites: Contains about 2,500 forecast time series consisting of about 50 key series for each of the 50 major countries of the world.
Worldcasts Basebook: Contains annual data from 1957 to date for about 125,000 series for all countries of the world.

PTS PREDALERT: Approximately 8,000 records are added on a weekly basis to provide users with access to the most current Predicasts data before it is transferred to the monthly cumulative databases.

PTS PROMT: Abstracts all significant information appearing in thousands of newspapers, business magazines, government reports, trade journals, bank letters, and special reports throughout the world.

PTS U.S. TIME SERIES: Composed of two subfiles: Predicasts Composites. Contains 500 time series on the U.S. giving historical data (since 1957) and projected consensus of published forecasts through 1990.
Predicast Basebook: Contains annual data from 1957 to date for about 30,000 series on U.S. production consumption, prices, foreign trade, agriculture, mining, manufacturing, wages and end-use distribution for many types of industries, products and services.

PTS U.S. FORECASTS: Contains abstracts of published forecasts for the United States from trade journals, business and financial publications, key newspapers, government reports, and special studies.

QUEBEC: This French-language database contains citations and abstracts from three Quebec newpapers: Le Devoir, La Presse, and Le Soleil.

RANGE: Covers published literature on range and pasture management in the U.S. and Canada.

RINGDOC/RING6475: Covers worldwide pharmaceutical literature, specifically designed to meet the in-

formation needs of pharmaceutical manufacturers.

RAPRA ABSTRACTS: A comprehensive database covering the commercial, technical, and research aspects of the rubber and plastics industries.

RILM ABSTRACTS: An international database containing abstracts of all significant literature on music.

SCISEARCH: A multidisciplinary index to the literature of science and technology prepared by the Institute for Scientific Information.

SELECTED WATER RESOURCES ABSTRACTS: File covers a wide range of water resource topics including water resource economics, ground and surface water hydrology, metropolitan water resources planning and management, and water-related aspects of nuclear radiation and safety.

SOCIAL SCISEARCH: A multidisciplinary database indexing every significant item from the 1,000 most important social sciences journals throughout the world and social sciences articles selected from 2,200 additional journals in the natural, physical, and biomedical sciences.

SPECIAL EDUCATION MATERIALS: Database provides comprehensive coverage of print and non-print educational materials of relevance to educators, parents, in-service trainers, assessment specialists, and others concerned with education, care and management of handicapped learners.

SPIN: Is designed to provide the most current indexing and abstracting of a selected set of the world's most significant physics journals.

STANDARD & POOR'S NEWS: Offers information on more than 9000 U.S. companies covering interim earnings, management changes, contract awards, mergers, acquisitions, bond descriptions, and corporate background, including subsidiaries, litigation and officers.

SURFACE COATINGS ABSTRACTS: Contains references to research literature on all aspects of paints and surface coatings including pigments, dyestuffs, resins, solvents, plasticisers, printing inks, insulations, fire retardants, occurrence and prevention of deterioration, testing, industrial hazards, pollution and marketing.

SAE: Provides access to technical papers presented at Society of Automotive Engineers meetings and conferences.

SAFETY: Provides broad, interdisciplinary coverage of literature related to the science of safety, a relatively new field devoted to identifying, evaluating, and eliminating or controlling hazards.

SPORT: Provides unique, extensive coverage of individual sports, including practice, training and equipment, recreation, sports medicine, physical education, sport facilities, and international sports history.

SSCI: The Social Science Citation Index provides extensive coverage of the journal literature and cited references in the social sciences.

SSIE: Covers current research in progress for both basic and applied research from over 1,300 organizations, including federal, state and local government; nonprofit associations; colleges and universities; individual investigators; and some non-U.S. organizations and private industry.

SWRA: Selected Water Resources Abstracts covers published literature on all aspects of water resources, including water-related aspects of life, physical, and social sciences, as well as related engineering and legal aspects of the characteristics, conservation, control, use, or management of water.

TITUS: Provides comprehensive information related to the textile industry, designed specifically for textile managers, engineers, and technicians.

TROPAG: Covers worldwide literature on tropical and subtropical agriculture, including crop production, crop protection, fertilizers, and soils, plant nutrition, agricultural techniques, crop processing, and storage, sociology, economics, commercial, and statistical information.

TSCA: This is a chemical dictionary file, listing nomenclature, molecular formulae, Registry Numbers, and EPA indentification numbers.

TULSA: Covers worldwide literature and patents re-

lated to oil and natural gas exploration, development, and production.

TRADE OPPORTUNITIES: Provides leads to export opportunities for U.S. businesses; the information is supplied by Foreign Service officers directly to the U.S. Department of Commerce.

TRADE OPPORTUNITIES WEEKLY: Includes current records added on a weekly basis and transferred to Trade Opportunities, File 106 on a quarterly basis.

TRIS: Provides transportation information in air, highway, rail, and maritime transport; mass transit; and other transportation modes.

TSCA INITIAL INVENTORY: A non-bibliographic dictionary listing chemical substances in commercial use in the U.S. as of June 1, 1979.

U.S. EXPORTS: Gives export statistics that reflect both government and non-government exports of domestic and foreign merchandise from the U.S. and Territories to foreign countries.

USCA: U.S. Contracts Awards provides access to more than 39,000 contracts awarded by the federal government and its agencies to both public and private sectors.

USCLASS: Contains all U.S. Classifications, Cross-Reference Classifications, and Unofficial Classifications for all patents issued from the start of the U.S. Patent Law, 1860, to date.

USPO/USPA: The U.S. Patent Office files cover all U.S. patents, continuations, divisionals, and defensive documents from 1971 to date. These files provide access to all information listed on the front page of a U.S. patent plus all Claims, as well as additional data elements.

USPSD: United States Political Science Documents provides cover-to-cover analysis of 150 major U.S. political science journals.

USRFP1/USRFP2/USRFP3: U.S. Requests for Proposals contains announcements and summaries of Federal Requests for Proposals in research and development, consulting, training, computer services, engineering, evaluation, and other professional service areas.

VETDOC: Covers worldwide journal literature on veterinary applications of drugs, hormones, vaccines, growth promotants, etc., for use in domestic and farm animals.

VOTES: Covers the complete record of roll call voting by members of the U.S. Congress. Contains bills, resolutions, joint resolutions, concurrent resolutions, executive treaties, nominations, and other legislative action taken to a roll call vote.

WATERLIT: Covers worldwide water resources literature collected by the South African Water Information Centre.

WPI/WPIL: The World Patents Index is a comprehensive and authoritative file of data relating

to patent specifications issued by the Patent Offices of 24 major industrial countries, plus EP and PCT patents, and Research Disclosure.

WELDASEARCH: Database provides primary coverage of the international literature on all aspects of the joining of metals and plastics and related areas such as metals spraying and thermal cutting.

WORLD ALUMINUM ABSTRACTS: Provides coverage of the world's technical literature on aluminum, ranging from ore processing through end uses.

WORLD TEXTILES: The machine-readable version of World Textiles Abstracts and indexes world literature on the science and technology of textile and related materials; on the technical economics, production, and management of the textile industry; and on the consumption of and international trade in textile materials and products.

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